



IOP MATHEMATICS GRADES 8 TO 11

PROGRAM RATIONALE AND PHILOSOPHY

The Integrated Occupational Program (IOP) is a distinctive program for students who learn best through hands-on experiential learning activities and when the development of knowledge, skills and attitudes is relevant to their personal experiences. Meaningful connections between learning and the community result in successful transition from the school setting to the workplace and preparation for responsible citizenship.

IOP Mathematics focuses on developing essential mathematics knowledge, skills and attitudes needed for everyday living at home, in the workplace and in the community. Mathematics competencies are developed through a problem-solving, experiential approach, using problems and activities that directly relate to students' current and future experiences. A variety of real-world activities/problems and community partnerships help students understand and appreciate the role of mathematics in our society. The use of manipulatives and other strategies/tools assists in addressing the diversity of learning styles and developmental stages of

Mathematics for students in the Integrated Occupational Program (IOP):

- begins at the student's level of understanding
- is developed within a problem-solving framework using everyday problems
- enhances the development of mathematical literacy¹ within the contexts of home, workplace and community.

IOP Mathematics emphasizes thinking processes, metacognition², career/life skills, teamwork and communication skills. Information and Communication Technology (ICT) outcomes, the use of calculators, computers and other technologies are integrated into the program to help students solve problems, and connect and transition to the world beyond school.


The Mathematics 16–26 program is derived from *The Common Curriculum Framework for K–12 Mathematics: Western Canadian Protocol for Collaboration in Basic Education*, 1995, and *The Common Curriculum Framework for K–12 Mathematics Grade 10 to Grade 12: Western Canadian Protocol for Collaboration in Basic Education*, 1996. Outcomes have been created and/or modified as needed. The Mathematics 16–26 sequence is designed for students whose needs, interests and abilities focus on basic

mathematical literacy: Selecting and applying appropriate mathematical operations, problem-solving strategies, tools and technology, and communicating using mathematical vocabulary in home, workplace and community experiences.
cognition: Learning-to-learn strategies; awareness of processes and strategies one uses when learning.

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1. *Mathematical literacy: Selecting and applying appropriate mathematical operations, problem-solving strategies, tools and technology, and communicating using mathematical vocabulary in home, workplace and community experiences.*
2. *Metacognition: Learning-to-learn strategies; awareness of processes and strategies one uses when learning.*

mathematical understanding. The emphasis is on the acquisition of practical life skills and proficiency in using mathematics to solve everyday problems, accommodate change, interpret information and create new knowledge within the contexts of the home, the workplace and the community.

This program makes extensive reference to the standards set out by the National Council of Teachers of Mathematics.

GOALS OF IOP MATHEMATICS

The principle goal of IOP Mathematics is to develop in students the following mathematics competencies in the context of solving everyday problems:

- identify the problem, and select and apply appropriate problem-solving strategies, mathematical operations and tools
- estimate and calculate solutions
- evaluate the process, result and personal/group performance
- develop teamwork skills and use appropriate vocabulary to reason and communicate mathematically
- apply mathematical literacy to life/work situations.

COMPONENTS OF IOP MATHEMATICS

IOP Mathematics has similarities with, and linkages to, related mainstream mathematics programs. However, IOP curriculum and resources are distinctive in that they:

- provide students with practical and applied opportunities to develop mathematical competencies
- promote the integration of curriculum and community partnerships to connect the school and other environments.

Student outcomes in this program of studies are organized into the four STRANDS of Mathematics. Students will solve everyday problems through:

- Number—Decimals, Percents, Fractions, Ratios, Proportion and Integers
- Shape and Space—Measurement, 3-D Objects and 2-D Shapes

- Patterns and Relations
- Statistics and Probability—Collecting and Analyzing Information.

Examples of everyday applications and illustrative examples are included to provide guidance when teaching. Examples of everyday applications are in italics.

CROSS-CURRICULAR, COMMUNITY AND WORKPLACE CONNECTIONS

IOP Mathematics has similarities with, and linkages to, other secondary mathematics programs. However, the IOP Mathematics program of studies and resources are distinctive in that they promote cross-curricular, community and workplace connections.

Cross-curricular Connections

IOP Mathematics promotes the integration of subjects to emphasize their interrelationships and connections to other school subjects. Teachers may wish to teach mathematics in thematic units, or integrate mathematics with units/projects in English language arts, science, social studies and career development.

Community and Workplace Connections

IOP Mathematics provides students with practical and applied opportunities to develop basic mathematical competencies. Community partnerships connect the school with environments beyond school, including the workplace.

CONCEPTUAL FRAMEWORK FOR K–12 MATHEMATICS

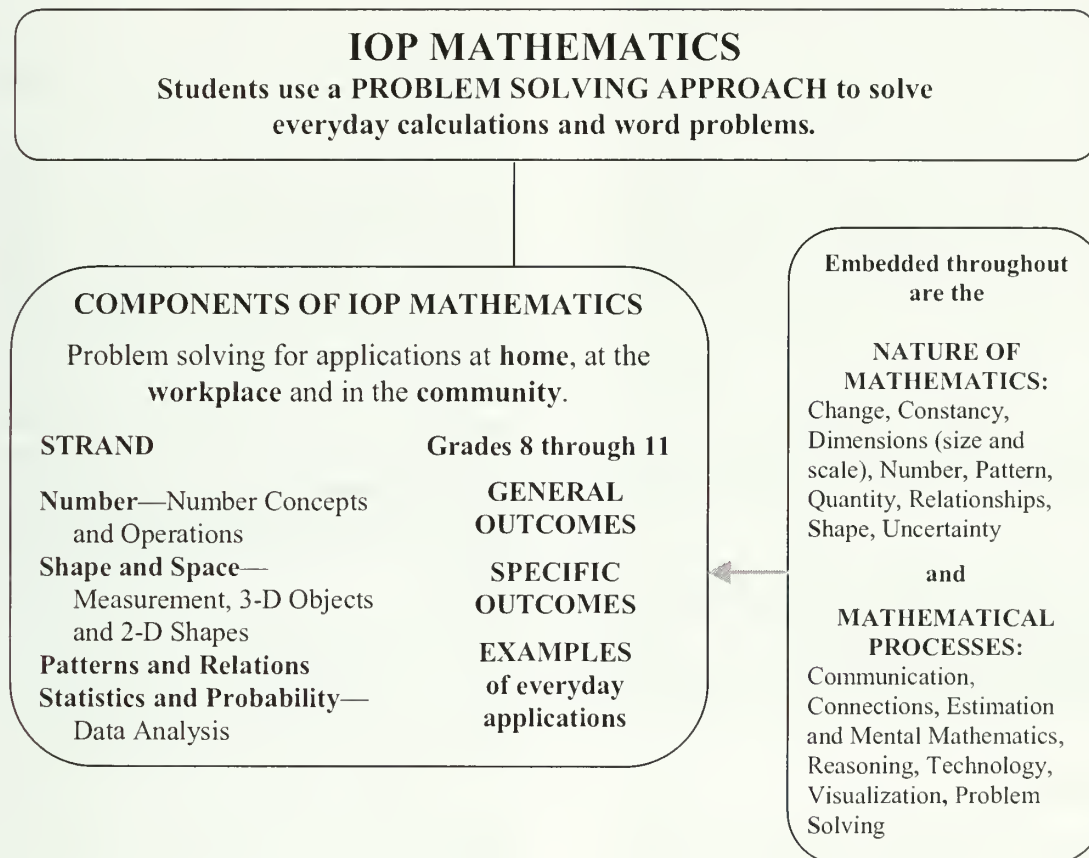
IOP Mathematics includes mathematical processes in the context of the nature of mathematics to assist students in achieving the goals of mathematics education and to encourage their lifelong learning in mathematics.

The conceptual framework outlined in this section:

- summarizes the philosophical view toward mathematics and mathematics education
- presents a multifaceted view of mathematics
- presents the discipline as a set of skills, procedures and concepts woven together.

The following graphic illustrates how student outcomes in IOP mathematics are organized by grade and strand and are influenced by Mathematical Processes and the Nature of Mathematics. These components are described more fully in this section.

GRAPHIC OF IOP MATHEMATICS



NATURE OF MATHEMATICS

The components of the nature of mathematics describe mathematics in a broad way in order to establish the wide variety of connections that can be made among the various strands used to organize the outcomes central to the IOP program of studies. These critical components must be addressed in a mathematics program and include:

<i>Change</i>	<i>Quantity</i>
<i>Constancy</i>	<i>Relationships</i>
<i>Dimension</i>	<i>Shape</i>
<i>Number</i>	<i>Uncertainty</i>
<i>Pattern</i>	

The brain is constantly looking for and making connections. “Because the learner is constantly searching for connections on many levels, educators need to orchestrate the experiences from which learners extract understanding... Brain research establishes and confirms that multiple complex and concrete experiences are essential for meaningful learning and teaching.” (Caine, p. 5)

By enriching our view of mathematics and the learning environment, the learner can successfully achieve the outcomes in the program of studies.

Change

Change is a very broad concept. Students must become sensitive to patterns, such as linear, exponential, logarithmic and periodic.

Change can be discussed from Kindergarten to Grade 12 across many aspects of mathematics. The study of change is often discussed in the context of calculus, but is often limited to this context. However, change is a much broader concept than that used in calculus. In order to make predictions, students need to describe and quantify their observations, attempt to build patterns, and identify those quantities that remain fixed and those quantities that change. For example, look at the pattern 4, 6, 8, 10, 12,... An elementary school student can describe this as skip counting by 2s, starting from 4. A senior high school student may describe this pattern as an arithmetic sequence, with first term 4, and a common difference of 2. Another student may describe it as a linear function with a discrete domain. All three interpretations are focusing on the changing size of the numbers within the sequence. To be able to understand change, students must become sensitive to patterns, such as linear, exponential, logarithmic and periodic. (Steen, p. 184)

Constancy

Constancy is described by the terms stability, conservation, equilibrium, steady state and symmetry.

Students are expected to communicate ideas visually, using diagrams and oral and written words, when describing constancy or invariance. Different aspects of constancy “are described by the terms stability, conservation, equilibrium, steady state, and symmetry.” (AAAS–Benchmarks, p. 270) The most important properties in mathematics and science relate to those properties that do not change when outside conditions change. Elementary school students deal with constancy in situations where different methods are used to solve a single multiplication problem, such as finding the area of a 3-tile by 4-tile tabletop. Secondary students

need to deal with constancy when they solve the more complicated multiplication problems that appear in determining the number of elements present in the sample spaces of probability problems. Many of these situations will involve permutations and combinations.

In geometry, a circle can be transformed into an ellipse by a simple stretch, and into a square by a more complex series of transformations; but there is no way that the circle can be transformed into a parabola. The closed figures, such as circles and squares, remain closed and cannot be transformed into open figures, such as parabolas. Triangles can be distorted in many ways, but all will have an angle sum of 180° . The straight line is characterized as having all its parts with the same slope. In solving many of the most important problems in mathematics, students need to concentrate on the properties that remain constant. This idea enables students to solve problems involving constant rates of change, lines with constant slope, direct variation situations, or the angle sums of polygons.

Dimension (size and scale)

The concept of dimension needs to be developed within an environment of physical objects.

The concept of dimension, most usually associated with 3-D objects, 2-D shapes or 1-D lines, needs to be developed within an environment of physical objects for all grades from Kindergarten to Grade 12. The prediction of the change in dimension of objects can be done using numbers attached to appropriate units. For example, with no knowledge of a formula, students in upper elementary grades can predict that doubling the side of a square generates four times the area. Junior and senior high school students need to be able to use algebraic structures to formalize this relationship.

Physical objects can all be described using measurement concepts. The development of perimeter, area and volume concepts relies on pattern recognition, not on memorization of

formulas. Descriptions of geometric patterns (number of vertices, sides and edges of various 3-D objects, 2-D shapes and 1-D lines); and the angle sum of various 2-D shapes is also encouraged. This type of data should be placed in charts and/or graphs to help students visualize their findings and predict patterns.

Number

The use of number must include number sense.

Number, number systems and the operations on numbers are vital to all mathematics learning. The use of number must go beyond procedure and accuracy to include what is called number sense. Number sense includes:

- an intuitive feeling about numbers and their multiple relationships
- construction of the meaning of number through a variety of experiences, and development of an appreciation of the need for numbers beyond whole numbers (NCTM, p. 38)
- an appreciation and ability to make quick order of magnitude approximations (Steen, p. 79) with emphasis on establishing quick and accurate estimations for computation and measurement
- the ability to detect arithmetic errors
- knowledge of place value and the effects of arithmetic operations.

Many numerical calculations are performed with calculators and computers, and students must be able to determine if the desired calculations have been done correctly. Students must plan for the efficient use of technological tools.

Number patterns should be recognized and used to count, to make predictions, to describe shapes and to compare.

Pattern

Mathematics is an exploratory science that seeks to understand every kind of pattern.

“What humans do with the language of mathematics is to describe patterns. Mathematics is an exploratory science that seeks to understand every kind of pattern.” (Steen, p. 8) Patterns exist in number, geometry, algebra and data. By helping students recognize, extend, create and use patterns as a routine aspect of their lives, mathematics will become a useful tool to assist them in their systematic and intellectual understanding of their environment.

Quantity

Quantitatively literate people use numbers to describe phenomena in all aspects of mathematics.

“Quantitatively literate young need a flexible ability to identify critical relations in novel situations, to express these relations in effective symbolic form, to use computing tools to process information, and to interpret the results of those calculations.” (Steen, p. 65)

Students have a strong desire to measure, code and order things. To this end, some of the outcomes are about single numbers, numbers attached to units of measure, and ordered sets of numbers. Other outcomes are about the interpretation of numbers and of number systems. The use of single numbers and of ordered pairs to describe phenomena in all aspects of mathematics, the natural sciences and the social sciences is very important.

With the growing use of technology to process numerical information, it is becoming essential for students to have a wide range of estimation skills so that they can evaluate whether or not the numerical output provided by a calculator or a computer is a reasonable solution to a given problem.

Relationships

The study of mathematics is the development of relationships between and among things.

The study of mathematics is the development of relationships between and among things. Part of mathematics should help students develop a sense of discovery that mathematicians over the years have felt and should prepare the way for students to make their own discoveries. Students should look for relationships among physical things, as well as the data used to describe those things. Descriptions of the attributes of objects are used to analyze symmetry and congruence and to classify things, using increasingly sophisticated language. Relationships will be described visually, symbolically, orally and in written form.

Shape

Shape in mathematics includes geometric representations of algebraic relations, the geometry of maps and the creation of networks of figures.

Shape in mathematics is central to geometry but also includes geometric representations of algebraic relations, the geometry of maps and the creation of networks of plane figures that can be used to construct 3-D objects. It is very important for students to look for and use similarities, congruences, patterns, transformations, dilations and tessellations in the solution of a range of problems.

The use of language to describe shapes is an important aspect of mathematics. This description allows for the classification of objects according to various attributes, the naming of objects, and the analysis of objects. The study of shape can be used to build a deductive system, which can assist in further, more detailed analysis. Shape is used in the development of visual models in other disciplines, such as the use of molecular models in chemistry and biology.

The use of technology to analyze and depict shape will increase in importance for students of mathematics as more and better software and hardware become available in classrooms.

Uncertainty

Uncertainty involves data, chance, measurements and errors.

Uncertainty involves data, chance, measurements and errors. Problems dealing with data, together with numbers in context found in the mass media, can be solved within the school mathematics program so long as the data provided and the problems posed have some meaning and relevance to students.

Chance deals with the predictable and the unpredictable outcomes of events. Students from an early age are expected to deal with the concept of chance. As they mature, the language they use to describe chance becomes more sophisticated and involves the vocabulary of probability theory.

When dealing with random events and complex experiments, students can generate large quantities of data requiring analysis. The use of various technologies enables the student to summarize data easily and to create a visualization of the data to help identify patterns in the information. In some instances the functions describing patterns are linear, periodic, logarithmic or exponential, and senior high school students are expected to use the appropriate algebraic structures to model the information contained within the pattern.

The quality of the output information is directly related to the quality of the input data. The study of uncertainty allows students to assess the reliability of input data, and to learn the processes whereby input data is converted to output information.

MATHEMATICAL PROCESSES

Students must also encounter the critical components of mathematics process in a mathematics program in order to achieve the goals of mathematics education and to encourage lifelong learning in mathematics. Students in IOP

are expected to build on and apply mathematical processes using everyday home, workplace and community problems.

This program of studies incorporates the following seven interrelated mathematical processes that are intended to permeate teaching and learning:

<i>Communication</i> [C]	– communicate mathematically
<i>Connections</i> [CN]	– connect mathematical ideas to other concepts in mathematics, to everyday experiences and to other disciplines
<i>Estimation and Mental Mathematics</i> [E]	– use estimation and mental mathematics where appropriate
<i>Problem Solving</i> [PS]	– relate and apply new mathematical knowledge through problem solving
<i>Reasoning</i> [R]	– reason and justify their thinking
<i>Technology</i> [T]	– select and use appropriate technologies as tools to solve problems
<i>Visualization</i> [V]	– use visualization to assist in processing information, making connections and solving problems.

Communication

Students must be able to communicate effectively how an answer was obtained.

Students need to communicate mathematical ideas clearly and effectively, orally and in writing.

Communication will help students make connections among different representations of mathematical ideas; namely, “physical, pictorial, graphic, symbolic, verbal and mental representations.” (National Council of Teachers of Mathematics [NCTM], p. 26)

NCTM COMMUNICATION STANDARDS

K–4	5–8	9–12
<i>The study of mathematics should include numerous opportunities for communication so that students can:</i>	<i>The study of mathematics should include opportunities to communicate so that students can:</i>	<i>The mathematics curriculum should include the continued development of language and symbolism to communicate mathematical ideas so that all students can:</i>
<ul style="list-style-type: none"> • relate physical materials, pictures, and diagrams to mathematical ideas • reflect on and clarify their thinking about mathematical ideas and situations • relate their everyday language to mathematical language and symbols • realize that representing, discussing, reading, writing, and listening to mathematics are a vital part of learning and using mathematics. 	<ul style="list-style-type: none"> • model situations using oral, written, concrete, pictorial, graphical, and algebraic methods • reflect on and clarify their own thinking about mathematical ideas and situations • develop common understandings of mathematical ideas, including the role of definitions • use the skills of reading, listening, and viewing to interpret and evaluate mathematical ideas • discuss mathematical ideas and make conjectures and convincing arguments • appreciate the value of mathematical notation and its role in the development of mathematical ideas. 	<ul style="list-style-type: none"> • reflect upon and clarify their thinking about mathematical ideas and relationships • formulate mathematical definitions and express generalizations discovered through investigations • express mathematical ideas orally and in writing • read written presentations of mathematics with understanding • ask clarifying and extending questions related to mathematics they have read or heard about • appreciate the economy, power, and elegance of mathematical notation and its role in the development of mathematical ideas.
(NCTM, p. 26)	(NCTM, p. 78)	(NCTM, p. 140)

Connections

Through connections students should begin to view mathematics as an integrated whole.

Students need numerous and varied experiences in order to appreciate the usefulness of mathematics and, at the same time, to explore connections within mathematics, from mathematics to other disciplines, and from mathematics to their daily experiences. When mathematical ideas are

connected to each other through concrete, pictorial and symbolic representations, students begin to view mathematics as an integrated whole.

This integration “allows students to see how one mathematical idea can help them understand others, and it illustrates the subject’s usefulness in solving problems, describing and modeling real-world phenomena, and communicating complex thoughts and information in a concise and precise manner.” (NCTM, p. 94)

NCTM CONNECTIONS STANDARDS

K–4	5–8	9–12
<i>The study of mathematics should include opportunities to make connections so that students can:</i>	<i>The mathematics curriculum should include the investigation of mathematical connections so that students can:</i>	<i>The mathematics curriculum should include investigation of the connections and interplay among various mathematical topics and their applications so that all students can:</i>
<ul style="list-style-type: none"> • link conceptual and procedural knowledge • relate various representations of concepts or procedures to one another • recognize relationships among different topics in mathematics • use mathematics in other curriculum areas • use mathematics in their daily lives. 	<ul style="list-style-type: none"> • see mathematics as an integrated whole • explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations • use a mathematical idea to further their understanding of other mathematical ideas • apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, psychology, science, and business • value the role of mathematics in our culture and society. 	<ul style="list-style-type: none"> • recognize equivalent representations of the same concept • relate procedures in one representation to procedures in an equivalent representation • use and value the connections among mathematical topics • use and value the connections between mathematics and other disciplines.
(NCTM, p. 32)	(NCTM, p. 84)	(NCTM, p. 146)

Reasoning

Reasoning helps students to make sense of mathematics and to be logical in their thinking.

Students need to develop confidence in their ability to reason and to justify their thinking within and outside of mathematics. The power of reasoning helps students to make sense of mathematics, to be logical in their thinking, and to convince others.

Inductive reasoning helps students explore and make conjectures from activities that allow generalizations from a pattern of observations.

Deductive reasoning helps students test conjectures and build arguments that serve to validate thinking. Deductive reasoning builds a structured body of knowledge.

NCTM REASONING STANDARDS

K–4	5–8	9–12
<i>The study of mathematics should emphasize reasoning so that students can:</i>	<i>Reasoning shall permeate the mathematics curriculum so that students can:</i>	<i>The mathematics curriculum should include numerous and varied experiences that reinforce and extend logical reasoning skills so that all students can:</i>
<ul style="list-style-type: none"> • draw logical conclusions about mathematics • use models, known facts, properties, and relationships to explain their thinking • justify their answers and solution processes • use patterns and relationships to analyze mathematical situations • believe that mathematics makes sense. 	<ul style="list-style-type: none"> • recognize and apply deductive and inductive reasoning • understand and apply reasoning processes, with special attention to spatial reasoning and reasoning with proportions and graphs • make and evaluate mathematical conjectures and arguments • validate their own thinking • appreciate the pervasive use and power of reasoning as a part of mathematics. 	<ul style="list-style-type: none"> • make and test conjectures • formulate counterexamples • follow logical arguments • judge the validity of arguments • construct simple valid arguments.
(NCTM, p. 29)	(NCTM, p. 81)	(NCTM, p. 143)

Technology

Technology will aid students in solving complex problems.

Improvements in technology, and its increased availability in schools, have changed the focus of mathematics education. The time saved by using calculators or computers to perform complex calculations can be used to help students better understand mathematical concepts. Students can then understand the relationships among concepts and use these relationships to solve problems.

Calculators and computers can be used as tools to:

- develop concepts
- explore and demonstrate mathematical relationships and patterns
- organize and display data
- assist with solving problems and thus promote independence
- encourage students to be inquisitive and creative
- decrease the time spent on tedious computations
- reinforce the learning of basic number facts and properties
- develop an understanding of computational algorithms
- create geometric displays
- simulate situations.

In some cases, technology will allow teachers to ask questions requiring a high level of thinking and will allow students to solve complex, multifaceted problems. Technology can foster environments in which the growing curiosity of students can lead to rich mathematical discoveries. In these environments, the control of exploring mathematical ideas can be turned over to students.

Visualization

Images are useful in describing the physical and mathematical environment.

Visualization “involves thinking in *pictures* and *images* and the ability to perceive, transform and re-create different aspects of the visual-spatial world.” (Armstrong, p. 10, italics in original) The use of images in the study of mathematics provides students with the opportunity to understand mathematical concepts and to make connections among them.

The physical environment is full of images. The images are of 3-D objects, 2-D shapes, 1-D lines and pictures. In geometry, the study of a 3-D object is assisted by visualizing either the net of 2-D shapes or the skeleton of 1-D lines required to construct the object.

The mathematical environment is full of images. These images are used to communicate mathematical concepts and multiple solutions to problems. At an elementary level, four piles, each containing three coins, can be used to represent $3 + 3 + 3 + 3 = 12$. Rearranging the piles into four rows of 3 can then be used to represent $4 \times 3 = 12$. Connecting the two images links the process of multiplication with that of repeated addition. At a more advanced level, analytic geometry describes figures algebraically and provides a tool for the visualization of algebraic relations. The analysis and interpretation of data, using a visual summary, aids in understanding the data and making predictions from it.

Problem Solving

Problem solving is the focus of mathematics at all grade levels.

“Problem solving—which includes the ways in which problems are represented, the meanings of the language of mathematics, and the ways in which one conjectures and reasons—must be central to schooling so that students can explore, create, accommodate to changed conditions, and actively create new knowledge over the course of their lives.” (NCTM, p. 4)

Problem solving is the focus of mathematics at all grade levels. The development of each student’s ability to solve problems is essential. Students develop a true understanding of mathematical concepts and procedures when they solve problems in meaningful contexts. Problem solving is to be employed throughout all of mathematics and should be embedded throughout all of the strands.

Problem solving provides an opportunity for students to be active in constructing mathematical meaning, to learn problem-solving strategies, to practise a variety of concepts and skills in a meaningful context, and to communicate mathematical ideas. Most problem-solving situations in the elementary years come from the everyday experiences of the student. Students are able to attach mathematical meaning to familiar activities. As they progress through school, the problems become more complex. The problems will arise from an exploration of mathematics itself, as well as from the world around them. Gradually, students become more confident in their ability to use and communicate mathematics, using correct terminology.

As students develop mathematically, they are able to solve more challenging problems on an increasing variety of topics. Students need the opportunity “to solve problems that require them to work cooperatively (and individually), to use technology, to address relevant and interesting mathematical ideas, and to experience the power and usefulness of mathematics.” (NCTM, pp. 75–76) By the time students reach the secondary level, many problem-solving strategies should be internalized and problem solving should be a process for constructing and reinforcing mathematical concepts.

Students should be confident and flexible problem solvers, using a wide range of strategies in their work, and accept that some problems have different solutions.

NCTM PROBLEM-SOLVING STANDARDS

K–4	5–8	9–12
<i>The study of mathematics should emphasize problem solving so that students can:</i>	<i>The mathematics curriculum should include numerous and varied experiences with problem solving as a method of inquiry and application so that students can:</i>	<i>The mathematics curriculum should include the refinement and extension of methods of mathematical problem solving so that all students can:</i>
<ul style="list-style-type: none"> • use problem-solving approaches to investigate and understand mathematical content • formulate problems from everyday and mathematical situations • develop and apply strategies to solve a wide variety of problems • verify and interpret results with respect to the original problem • acquire confidence in using mathematics meaningfully. 	<ul style="list-style-type: none"> • use problem-solving approaches to investigate and understand mathematical content • formulate problems from situations within and outside mathematics • develop and apply a variety of strategies to solve problems, with emphasis on multistep and nonroutine problems • verify and interpret results with respect to the original problem situation • generalize solutions and strategies to new problem situations • acquire confidence in using mathematics meaningfully. 	<ul style="list-style-type: none"> • use, with increasing confidence, problem-solving approaches to investigate and understand mathematical content • apply integrated mathematical problem-solving strategies to solve problems from within and outside mathematics • recognize and formulate problems from situations within and outside mathematics • apply the process of mathematical modeling to real-world problem situations.
(NCTM, p. 23)	(NCTM, p. 75)	(NCTM, p. 137)

IOP PROBLEM-SOLVING FRAMEWORK

Students in IOP mathematics will use a problem-solving framework in meaningful home, workplace and community contexts to achieve the general and specific outcomes in the strands of mathematics.

Students will determine which mathematical operation(s) can be used to solve everyday problems, and will then solve problems, using technology as appropriate.

Students will demonstrate an understanding and proficiency with calculations involving whole numbers, decimals, percents, rates, ratios, proportions and integers; measurement;

collecting and analyzing information; patterns and relationships; and objects and shapes required in everyday life.

Students will apply mathematical vocabulary, skills and strategies to work with others, as members of a team or independently as appropriate, to solve problems and complete tasks.

Students will communicate mathematics processes, strategies and solutions in written and verbal form.

Students will investigate the roles of mathematics and technology in a variety of career/workplace situations.

Understand the Problem

- ask questions
- sort and classify information
- look for patterns
- interpret pictures, charts, tables and graphs
- identify key words
- simplify questions
- identify important and unimportant information

Look Back

- check solutions for reasonableness and accuracy using strategies such as opposite operations, estimation, pencil and paper, a calculator, a computer
- demonstrate teamwork skills such as listening, accepting the ideas of others, evaluating personal performance and analyzing group interactions
- evaluate choices and the process in problem solving, then redefine the action plan as appropriate
- examine the application of a concept/strategy in other subject areas, the home or the workplace
- evaluate the appropriateness of technology and other tools used to investigate and solve problems

Think of a Plan

- develop an action plan
- identify the appropriate materials and tools for implementing the action plan
- draw a picture or use symbols or use manipulatives
- predict/estimate solutions to problems

Carry Out the Plan

- use data gathered from a variety of electronic and other sources to solve problems
- solve problems using pencil and paper, manipulatives, symbols, a calculator, a computer or other tool/strategy
- state solutions to problems in conclusion sentences
- describe and/or demonstrate solutions, e.g., in a journal or computer presentation, using manipulatives or symbols
- work independently or as a member of a group as appropriate
- apply communication strategies such as sharing ideas clearly, using appropriate listening and representing skills

GRADE 8

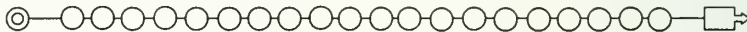
STRAND: Number (Number Concepts and Operations)

Students will:

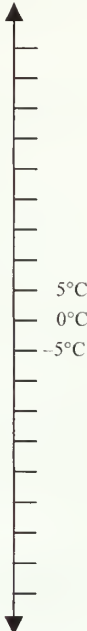
- estimate and solve everyday problems with numbers in home, workplace and community situations: using technology as appropriate
- develop and demonstrate number sense to describe quantities, represent numbers in multiple ways, estimate, and apply appropriate arithmetic operations.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Demonstrate a number sense for whole numbers, and explore proper fractions, mixed numbers, decimals, percents and integers to help solve everyday arithmetic problems.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> estimate quantities, and read and write numerals and number words to 1 000 000. [C, CN, V] recognize, model and describe multiples, factors, composites and primes [C, R, V] 	<p><i>Recognize and understand numbers in the media, e.g., sales of CDs of favourite Canadian artists, prices of vehicles, costs of vacations.</i></p> <p>The population of Calgary is eight hundred seventy-six thousand five hundred nineteen. The population of Edmonton is six hundred forty-eight thousand two hundred eighty-four. How many more people live in Calgary than in Edmonton?</p> <p>SOLUTION $876\,519 - 648\,284 = 228\,235$</p> <p>A shelf can hold 15 glasses. If 5 glasses fit in a row along the back of the shelf, how many glasses are in each column?</p> <div data-bbox="573 1321 1108 1550"> <p>View of shelf from above</p> </div> <p>SOLUTION There are 3 glasses in each column.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																												
<ul style="list-style-type: none">represent and describe decimals, proper fractions, mixed numbers and equivalent fractions concretely, pictorially and symbolically [C, R, V]	<p>Complete the two columns on the right.</p> <table><tr><th>Activity</th><th>Time (hours)</th><th>Fraction of a Day</th><th>Fraction in Lowest Form</th></tr><tr><td>Sleep</td><td>8</td><td>$\frac{8}{24}$</td><td>$\frac{1}{3}$</td></tr><tr><td>Attend school</td><td>6</td><td>$\frac{6}{24}$</td><td>$\frac{1}{4}$</td></tr><tr><td>Eat</td><td>3</td><td>$\frac{3}{24}$</td><td>$\frac{1}{8}$</td></tr><tr><td>Visit friends</td><td>2</td><td>$\frac{2}{24}$</td><td>$\frac{1}{12}$</td></tr><tr><td>Watch television</td><td>2</td><td>$\frac{2}{24}$</td><td>$\frac{1}{12}$</td></tr><tr><td>Other activities</td><td>3</td><td>$\frac{3}{24}$</td><td>$\frac{1}{8}$</td></tr></table> <p>Dakota works part-time in the library shelving books. The books are sorted using a letter and number system. First they are sorted using letters, and then they are sorted from the lowest to highest number. In what order would the following books be put back on the shelf?</p> <p>Book #1: Q 234.56 Book #2: Q 145.29 Book #3: Q 234.17 Book #4: Q 130.223</p> <p>SOLUTION #4, #2, #3, #1</p>	Activity	Time (hours)	Fraction of a Day	Fraction in Lowest Form	Sleep	8	$\frac{8}{24}$	$\frac{1}{3}$	Attend school	6	$\frac{6}{24}$	$\frac{1}{4}$	Eat	3	$\frac{3}{24}$	$\frac{1}{8}$	Visit friends	2	$\frac{2}{24}$	$\frac{1}{12}$	Watch television	2	$\frac{2}{24}$	$\frac{1}{12}$	Other activities	3	$\frac{3}{24}$	$\frac{1}{8}$
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<ul style="list-style-type: none">identify decimal equivalents for commonly used fractions, such as halves, quarters and tenths [R, V]	<p>A necklace has 20 beads.</p> <p></p> <p>a. If half of the beads are red and half are blue, how many red beads are there?</p> <p>b. How many beads are needed to make an armband if only $\frac{1}{4}$ the number of beads from the necklace are needed?</p> <p>SOLUTION a. 10 red beads b. 5 beads</p>																												

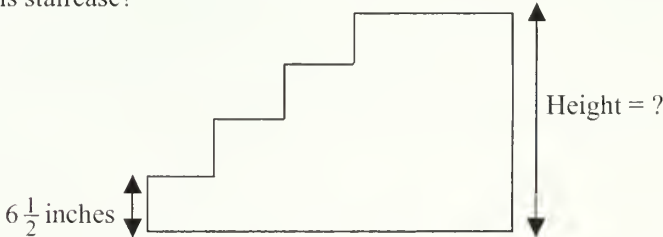
[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> compare and order positive and negative numbers on a number line or other tool, such as a thermometer [R, V]. 	<p>Finish writing the numbers on the scale below.</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>a. Show where these temperatures will be on the scale:</p> <p>the mean surface temperature on Earth, 15°C</p> <p>the mean temperature of the human body, 37°C</p> <p>the mean surface temperature on Mars, -40°C</p> <p>the freezing temperature of water, 0°C</p> <p>b. List the following temperatures in order from coldest to hottest:</p> <p>15°C (mean surface temperature on Earth)</p> <p>37°C (mean temperature of the human body)</p> <p>-40°C (mean surface temperature on Mars)</p> <p>100°C (boiling point of water)</p> <p>0°C (freezing point of water)</p> <p>-223°C (mean surface temperature on Pluto).</p> <p>SOLUTION</p> <p>-223°C, -40°C, 0°C, 15°C, 37°C, 100°C</p> </div> </div>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																				
<p>General Outcome</p> <p>Solve everyday problems by applying arithmetic operations to whole numbers, decimals, percents and proper fractions.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> add and subtract decimals to hundredths concretely, pictorially, and symbolically as appropriate in everyday living [PS, T, V] multiply and divide decimals to hundredths concretely, pictorially and symbolically as appropriate in everyday living [PS, T, V] use a variety of strategies to assess the reasonableness of calculations, such as estimation, mental mathematics, and tools such as tables, graphs, calculators and/or computers [CN, E, R] 	<p><i>Make and/or check change when making purchases. Estimate/calculate costs of school supplies during the year. Estimate/calculate restaurant bills.</i></p> <p>Charles bought the following items on sale (GST is included): DVD for \$24.68, CD for \$19.99, and poster for \$15.98. He gave the cashier three \$20 bills and one \$5 bill. How much change did he receive?</p> <p>SOLUTION $\\$24.68 + \\$19.99 + \\$15.98 = \\60.65 $\\$65.00 - \\$60.65 = \\$4.35$</p> <p>Nancy bought 5 pencils at 68¢ each, 2 erasers at 10¢ each, and 8 notebooks at \$1.89 each. What was her total bill?</p> <p>SOLUTION $5 \times \\$0.68 = \\3.40 $2 \times \\$0.10 = \\0.20 $8 \times \\$1.89 = \\15.12 Total = \$18.72</p> <p><i>Demonstrate an understanding of comparative shopping, using catalogues, flyers, television ads, field trips to local stores.</i></p> <p>Estimate how much Frank spends on lunch each week if he eats the following: Monday: Hamburger, pop Tuesday: Hot dog, apple Wednesday: Soup/bun, salad, milk Thursday: Daily special, milk Friday: Pizza, pop, apple Use the above week to estimate how much Frank spends each month.</p> <table border="1" data-bbox="987 1270 1327 1603"> <thead> <tr> <th colspan="2">Cafeteria Menu</th></tr> </thead> <tbody> <tr> <td>Daily Special</td><td>\$4.00</td></tr> <tr> <td>Hamburger</td><td>\$3.50</td></tr> <tr> <td>Hot Dog</td><td>\$2.00</td></tr> <tr> <td>Pizza</td><td>\$3.00</td></tr> <tr> <td>Soup/bun</td><td>\$2.00</td></tr> <tr> <td>Salad</td><td>\$2.00</td></tr> <tr> <td>Pop</td><td>\$1.00</td></tr> <tr> <td>Milk</td><td>\$1.00</td></tr> <tr> <td>Apple</td><td>\$0.50</td></tr> </tbody> </table>	Cafeteria Menu		Daily Special	\$4.00	Hamburger	\$3.50	Hot Dog	\$2.00	Pizza	\$3.00	Soup/bun	\$2.00	Salad	\$2.00	Pop	\$1.00	Milk	\$1.00	Apple	\$0.50
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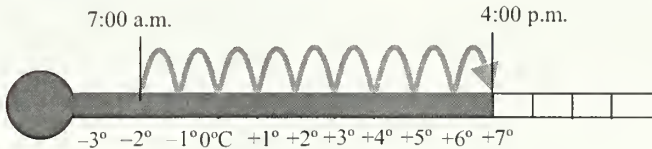
[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)												
<ul style="list-style-type: none"> convert among fractions, decimals and percents to facilitate solving problems [CN, PS] 	<p>SOLUTION \$4.50, \$2.50, \$5.00, \$5.00, \$4.50 Frank spends approximately \$5.00 each day, which is approximately \$25.00 each week and \$100 each month.</p> <p><i>Demonstrate the relationships among dollars, cents, fractions and decimals, e.g., 50 cents is half of a dollar, which can be written as $\frac{50}{100}$, $\frac{1}{2}$ and \$0.50; decimals and percents mean 'out of one hundred,' therefore $0.20 = \frac{20}{100} = 20\%$.</i></p> <p>Use the chart to answer the questions below.</p> <table border="1" data-bbox="645 558 1218 838"> <thead> <tr> <th colspan="2">Cyril's Monthly Budget</th></tr> </thead> <tbody> <tr> <td>Movies</td><td>\$12.00</td></tr> <tr> <td>Food</td><td>\$18.00</td></tr> <tr> <td>Clothes</td><td>\$45.00</td></tr> <tr> <td>Music</td><td>\$25.00</td></tr> <tr> <td>Total</td><td>\$100.00</td></tr> </tbody> </table> <p>a. What fraction of Cyril's budget was spent on music? b. What percentage of Cyril's budget was spent on music?</p> <p>SOLUTION a. $\frac{25}{100} = \frac{1}{4}$ b. 25%</p>	Cyril's Monthly Budget		Movies	\$12.00	Food	\$18.00	Clothes	\$45.00	Music	\$25.00	Total	\$100.00
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<ul style="list-style-type: none"> use fractions as appropriate when measuring [CN, R] 	<p><i>Measure the dimensions of a window to purchase/make curtains, e.g., $2\frac{1}{2}$ feet by $3\frac{1}{4}$ feet.</i></p> <p><i>Measure flour to make bannock or biscuits, e.g., $3\frac{1}{2}$ c flour.</i></p> <p>If the height of each stair is $6\frac{1}{2}$ inches tall, how many inches high is this staircase?</p>  <p>SOLUTION Height = $6\frac{1}{2} + 6\frac{1}{2} + 6\frac{1}{2} + 6\frac{1}{2} = 26$ inches or $4(6\frac{1}{2}) = 26$ inches</p>												

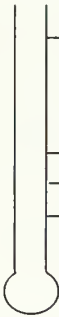
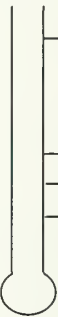
[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<ul style="list-style-type: none"> estimate and add, subtract, multiply and divide proper fractions with like denominators [CN, E, PS, T]. 	<p>Calculate the perimeter of a square room by changing $5\frac{3}{4}$ feet to 5.75 feet and multiplying by 4, e.g., when purchasing baseboards.</p> <p>Tom swam $2\frac{1}{4}$ laps during the warm-up, 5 laps during practice, and $1\frac{3}{4}$ laps after practice.</p> <ol style="list-style-type: none"> How many laps did Tom swim? If the pool was $\frac{1}{2}$ km in length (one lap), how many kilometres did he swim? <p>SOLUTION</p> <ol style="list-style-type: none"> 9 laps $9 \times \frac{1}{2} = 4\frac{1}{2}$ km
<p>General Outcome</p> <p>Solve everyday problems by applying arithmetic operations on integers.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> identify and discuss common uses of positive and negative numbers, such as above/below sea level, temperatures [C, CN] apply common terminology relating to integers, such as positive/negative, gain/loss, above/below and plus/minus [C, CN] 	<p>See IOP Studio (online guide to implementation).</p> <p>Write the integer that best describes these situations:</p> <ol style="list-style-type: none"> 15 metres below sea level 9°C above freezing spent \$20.00 lost 2 kg 5 extra marks on a test. <p>SOLUTION</p> <ol style="list-style-type: none"> -15 +9°C -\$20.00 -2 +5

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																															
<ul style="list-style-type: none">demonstrate addition of pairs of integers between -10 and $+10$, concretely, pictorially and symbolically as appropriate [PS, V].	<p>Calculate temperature change throughout a day, e.g., -2°C at 7:00 a.m., $+7^{\circ}\text{C}$ at 4:00 p.m.</p>  <p>The following rules were used when scoring during a tournament:</p> <ol style="list-style-type: none">If a team won, their score was positive.If a team lost, their score was negative.If teams tied, both scores were positive. <p>During a tournament the scores were recorded as follows:</p> <table border="1" data-bbox="573 650 972 866"><tr><td>Game 1</td><td>A vs. B 3 to 2</td><td>C vs. D 4 to 5</td></tr><tr><td>Game 2</td><td>A vs. C 2 to 2</td><td>B vs. D 3 to 1</td></tr></table> <p>Use the rules to complete the table and determine the number of points each team had after two games.</p> <p>SOLUTION</p> <table border="1" data-bbox="573 1015 1348 1183"><tr><th></th><th colspan="4">Teams and Points</th></tr><tr><th></th><th>Team A</th><th>Team B</th><th>Team C</th><th>Team D</th></tr><tr><td>Game 1</td><td>+3</td><td>-2</td><td>-4</td><td>+5</td></tr><tr><td>Game 2</td><td>+2</td><td>+3</td><td>+2</td><td>-1</td></tr><tr><td>Total Points</td><td>+5</td><td>+1</td><td>-2</td><td>+4</td></tr></table>	Game 1	A vs. B 3 to 2	C vs. D 4 to 5	Game 2	A vs. C 2 to 2	B vs. D 3 to 1		Teams and Points					Team A	Team B	Team C	Team D	Game 1	+3	-2	-4	+5	Game 2	+2	+3	+2	-1	Total Points	+5	+1	-2	+4
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General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> estimate and measure temperature, and use conversion charts and other tools to compare Celsius to Fahrenheit, as appropriate in everyday experiences [CN, E, PS]. 	<p>Bacteria will grow most rapidly between the temperatures of 40°F and 140°F. Use the thermometers below to respond to the following:</p> <ol style="list-style-type: none"> Estimate the range in °C? A refrigerator should be set to what range of temperatures (in degrees Celsius) to keep food from freezing and reduce bacteria growth? <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Celsius</p>  </div> <div style="text-align: center;"> <p>Fahrenheit</p>  </div> </div> <p>SOLUTION</p> <ol style="list-style-type: none"> Approximately 4°C to 60°C. The refrigerator should be set between 1°C and 4°C.

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Shape and Space (Measurement)

Students will:

- estimate and take accurate measurements in everyday metric (SI) and Imperial units of measurement and solve problems at home, in the workplace and community using appropriate measuring devices, strategies and technology
- work individually or as members of a team, communicate mathematically and investigate the application of measurement knowledge and skills in a variety of careers and workplace situations.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Solve everyday problems involving perimeter of regular polygons and circumference.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> estimate and use everyday metric tools and units to take accurate linear measurements, e.g., millimetre, centimetre, metre, kilometre [E, PS] estimate and use everyday Imperial tools and units to take accurate linear measurements, e.g., inches, feet, yards, miles [E, PS] estimate, measure and calculate perimeters of quadrilaterals and triangles [CN, E] use conversion charts, calculators and/or other tools to compare and convert common SI and Imperial linear units, as required in everyday living [CN, PS] 	<p><i>Estimate and/or measure lengths and widths of rooms at home, distance from home to school.</i></p> <p><i>Estimate and/or measure the length and width of a car, truck or minivan; height from the floor to the ceiling in the classroom; distances between cities, towns or other areas in Alberta.</i></p> <p>If a football team ran one lap around the football field during a warm-up, how many metres did they run?</p> <div data-bbox="690 1236 1108 1407" data-label="Diagram"> </div> <p>SOLUTION $P = 100\text{ m} + 60\text{ m} + 100\text{ m} + 60\text{ m} = 320\text{ m}$</p> <p>Amy is 5 feet tall. How tall is she to the nearest tenth of a metre?</p> <p>SOLUTION $5\text{ ft} \times 0.305\text{ m/ft} = 1.525\text{ m} = 1.5\text{ m}$</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> demonstrate the relationships among circumference, radius and diameter of circles [V] 	<p>Chris must replace the string on a pull-start lawnmower. The string is wound around a circular drum with a diameter of 4 inches. If the string must be wrapped around the drum 3 times, how long should the string be? Round to the nearest inch.</p> <div data-bbox="573 348 1336 564"> <p>The diagram consists of two parts. On the left, a curved line represents a portion of a circle, with the text 'Length of String = ?' next to it. On the right, a 'Top View of a Lawnmower' is shown. It is a rectangular shape with four small circles representing wheels at the corners. In the center of the rectangle is a circle representing the drum, with a horizontal double-headed arrow through its center labeled '4 inches'.</p> </div> <p>SOLUTION $C = \pi d = 3.14 \times 4 = 12.56$ inches $12.56 \times 3 = 37.68$ inches = 38 inches</p>
<ul style="list-style-type: none"> estimate and calculate circumference, radius and diameter of circles [E, PS, T]. 	<p><i>Estimate and/or measure basketball/hockey circles, tires, steering wheels.</i></p> <p>Men's basketballs have a circumference of 29.5 inches. Estimate and calculate the diameter of this basketball, round to the nearest inch.</p> <p>SOLUTION $d = \frac{C}{\pi}$ Estimate $30 \div 3 = 10$ inches Actual $29.5 \div 3.14 = 9.39$ inches. Round to 9 inches.</p>

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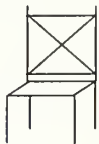
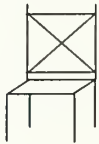
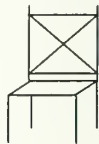
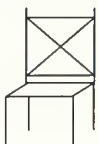
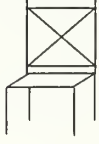
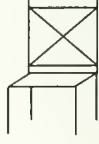
General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Solve everyday problems involving time.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> define start time, stop time and elapsed time [C, CN] recognize the relationships among seconds, minutes, hours, days, weeks, months and years, centuries and millennium, using a variety of tools such as calendars and technology [CN] estimate and measure time on 12-hour and 24-hour clocks, using digital and analog timepieces [CN, E]. 	<p>William went fishing at 8:35 a.m. If he returned at 8:45 p.m., how long did he fish?</p> <p>SOLUTION 8:35 a.m. to 8:35 p.m. = 12 hours 8:35 p.m. to 8:45 p.m. = 10 minutes He went fishing for 12 hours and 10 minutes</p> <p>A child is 1.5 years old. How many months old is the child?</p> <p>SOLUTION $12 + 6 = 18$ months old</p> <p>A parking meter is in effect from 0800–1800 hours. Will a driver have to pay for parking at 7:00 p.m.? Explain.</p> <p>SOLUTION Parking is in effect from 8:00 a.m. to 6:00 p.m. so the driver will not have to pay for parking.</p>

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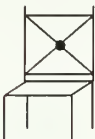
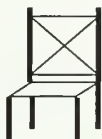

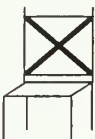


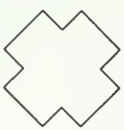
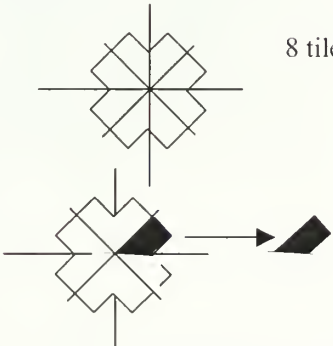
STRAND: Shape and Space (3-D Objects and 2-D Shapes)

Students will

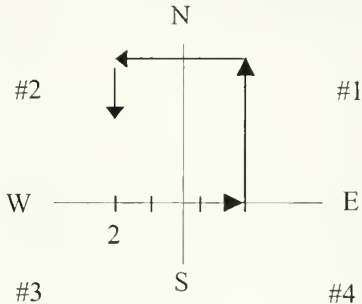
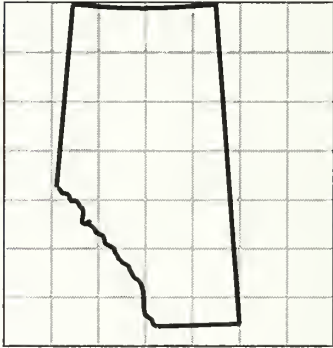
- create, analyze and manipulate 3-D objects and 2-D shapes using transformations, technology and other tools as appropriate to better understand shapes and objects and their relationships to home, workplace and community environments.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Use visualization and symmetry to solve everyday problems involving classification and sketching of objects and shapes.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> identify, classify, describe and construct models of basic 3-D objects, e.g., rectangular prisms, cubes, cylinders, cones, spheres [C, R, T, V] identify, classify and describe basic 2-D shapes, such as rectangles, squares, triangles, circles, polygons [C, R, T, V] identify, classify, describe and construct 2-D shapes using a variety of strategies and tools, e.g., squares, rectangles, triangles [R, T, V] recognize and identify from everyday observations and experiences: points, lines, parallel lines, intersecting lines, perpendicular lines, vertical lines, horizontal lines and line segments [CN, V] 	<p>Use modelling clay, cardboard, technology or other strategies to construct cylinders, cones, cubes, spheres and rectangular prisms.</p> <p><i>Observe the shape and colour of traffic signs or safety labels on household goods.</i> See IOP Studio (online guide to implementation).</p> <p>Use grid and dot paper, computer software, drinking straws, newspapers, toothpicks, protractor, compass, straightedge and T-square to construct 2-D shapes.</p> <p>Richard helps repair chairs, and it is helpful if he can recognize points and lines. Highlight an example of each term on the diagrams below.</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%; text-align: center;"> <p>point</p>  </div> <div style="width: 33%; text-align: center;"> <p>vertical lines</p>  </div> <div style="width: 33%; text-align: center;"> <p>horizontal lines</p>  </div> <div style="width: 33%; text-align: center;"> <p>intersecting lines</p>  </div> <div style="width: 33%; text-align: center;"> <p>perpendicular lines</p>  </div> <div style="width: 33%; text-align: center;"> <p>parallel lines</p>  </div> </div>

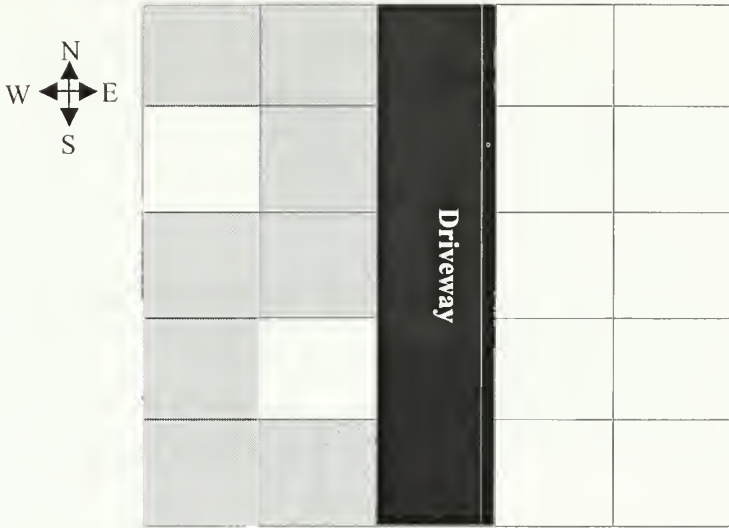
[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> identify lines of symmetry on quadrilaterals and triangles [V] 	<p>SOLUTION</p> <div data-bbox="575 254 1230 813"> <div>point</div>  <div>vertical lines</div>  <div>horizontal lines</div>  <div>intersecting lines</div>  <div>perpendicular lines</div>  <div>parallel lines</div>  </div>
	<p>Use lines of symmetry to install bathroom tiles.</p> <p>Find the number of tiles needed to create this tile design by drawing all the lines of symmetry.</p>  <p>Sketch the shape of a single tile.</p> <p>SOLUTION</p>  <p>8 tiles were used to create this tile design</p> <p>Shape of 1 tile.</p> <p>See IOP Studio (online guide to implementation).</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> recognize and label the quadrants on a grid [V]. 	<p>Use grid paper to respond to the following. If a drilling rig camp is located at the origin of a coordinate plane, in which quadrant is a water truck if it leaves the camp and travels 2 units east, 5 units north, 4 units west, and 2 units south?</p> <p>SOLUTION Quadrant #2</p> 
<ul style="list-style-type: none"> identify and plot points in the first quadrant of a coordinate grid, using ordered pairs [R, T, V] reproduce a given geometric drawing on grid paper [CN, V] 	<p>A firefighter was sent to a fire located at coordinate (3,2). Use a coordinate grid to locate the fire.</p> <p><i>Communicate and apply terms of directions, such as north, north-west and relate these to grids and locations on city, provincial and other maps.</i></p> <p>Redraw the map of Alberta on grid paper. Place your community and others on the map.</p> 

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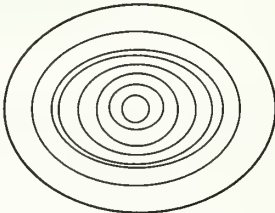
General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> recognize and describe motion as a slide (translation), a turn (rotation), or a flip (reflection) [C, V] 	<p><i>Move products in a warehouse or storeroom according to a plan.</i></p> <p>A landscaper created a flowerbed beside a driveway. Finish this plan if the east side of the driveway is an exact reflection of the west side.</p>  <p>The diagram shows a 5x5 grid of squares. A vertical black bar, labeled 'Driveway', runs through the center of the grid, separating it into two 5x2 grids. To the left of the driveway, there are 5 grey squares in the first column and 1 white square in the second column. To the right of the driveway, there are 5 white squares in the first column. A compass rose is located to the left of the grid, with 'N' at the top, 'S' at the bottom, 'E' to the right, and 'W' to the left.</p>
<ul style="list-style-type: none"> identify and describe tessellations found in the environment that were created with regular and irregular shapes [C, CN, T, V]. create tessellations with regular and irregular shapes [C, CN, T, V] 	<p><i>Identify tessellations found at home, school or community, e.g., quilts, wings of a fly, tire treads, manhole covers, stained glass windows, floor tiles, wallpaper, playground equipment, paper towels, soles of shoes, bridges.</i></p>

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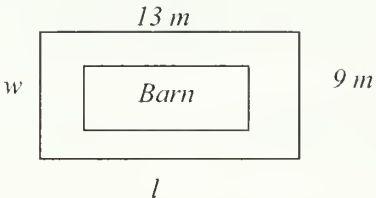
STRAND: Patterns and Relations (Patterns and Relationships)

Students will:

- recognize that patterns and relationships exist in nature and everyday living
- use patterns and relationships to solve everyday problems at home, in the workplace and in the community.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Use relationships to summarize, generalize and extend patterns to solve everyday problems.</p> <p>Specific Outcomes</p> <p>Students will:</p> <ul style="list-style-type: none">• identify and describe patterns and relationships in nature and everyday living using everyday language in spoken or written form [C, CN, R, V]	<p><i>Describe patterns, such as seasonal changes, personal/family routines, school timetables, cause and effect behaviours, and media schedules.</i></p> <p>Each ring in this tree trunk represents a year of growth.</p> <p>a. Estimate the age of this tree.</p>  <p>b. The rings are not evenly spaced. Give possible reasons for these differences.</p> <p>SOLUTION</p> <p>a. 8 years</p> <p>b. The rings represent the growing conditions that year. If the tree did not receive enough nutrients or if the pollution levels were high, the tree would have a thin ring. Good growing conditions would give the tree a wider ring.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> describe everyday situations using variables [C, CN] interpret formulas related to practical situations, i.e., perimeter of a square or a triangle [CN, PS, V]. 	<p>Use variables to calculate numbers of cars, trucks and total vehicles in a parking lot; numbers of males and females in the classroom.</p> <p>Vehicles in a parking lot: $T = t + c$ where T = total number of vehicles, t = trucks, c = cars</p> <p>Males and females in the classroom: $T = m + f$ where T = total number of students, m = number of males, f = number of females.</p> <p>A farmer wants to build a rectangular fence around the barn. Draw a diagram and calculate the perimeter of the fence.</p> <p>SOLUTION $P = 2w + 2l$ $(2 \times 9) + (2 \times 13)$ $P = 44 \text{ m}$</p> 

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Statistics and Probability (Collecting and Analyzing Information)

Students will:

- collect and/or generate data
- display data and other information related to home, workplace and community applications, using a variety of strategies
- interpret, analyze and maintain charts, graphs and other records for personal use
- use probability, chance, and predictions when planning and making everyday decisions.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)										
<p>General Outcome</p> <p>Develop and implement a plan for collecting, displaying, and analyzing information and data gathered from appropriate sources within everyday contexts.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • identify appropriate information/data sources, i.e., first-hand, second-hand and combinations [R] • use a variety of strategies to interpret information from prepared graphs and/or charts, such as: <ul style="list-style-type: none"> – read axis and column sub-headings, and text under, beside or above – compare and analyze pictures, bars, lines, symbols or markers – find trends or patterns – discuss information with classmates or others for clarification – re-read to connect information in graphs/charts to surrounding and/or other information [C, E, PS, R]. 	<p><i>Sources such as newspapers, radio and television broadcasts, Internet, interviews, biographies, autobiographies.</i></p> <p>Four option courses are offered to Grade 8 students. Examine the circle graph and discuss the information on the graph.</p> <div data-bbox="800 1078 1164 1548"> <p>Percentage of Requests for Option Courses</p> <table border="1"> <caption>Percentage of Requests for Option Courses</caption> <thead> <tr> <th>Course</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Art</td> <td>37%</td> </tr> <tr> <td>Music</td> <td>28%</td> </tr> <tr> <td>Drama</td> <td>22%</td> </tr> <tr> <td>Outdoor Education</td> <td>13%</td> </tr> </tbody> </table> </div> <p>If Outdoor Education was not offered, predict the course that the majority of those students would take.</p>	Course	Percentage	Art	37%	Music	28%	Drama	22%	Outdoor Education	13%
Course	Percentage										
Art	37%										
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General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<ul style="list-style-type: none"> • make predictions based on information and data [R] • read, discuss and interpret information from a prepared database [C, E, PS, R] • develop and communicate appropriate conclusions, and discuss the reasonableness of data and results [R] • gather, organize and display information and data using a variety of organizers/methods, such as journals, diagrams, charts, lists, graphs, spreadsheets, rank ordering and/or frequency charts [C, T, V]. 	<p><i>Use internet sites to investigate school-related topics, questions, problems or issues.</i></p> <p><i>Examine information on a library database, Internet site, etc.</i></p> <p><i>Discuss the reasonableness of the information on a database.</i></p> <p>You cannot read the first digit of a phone number from your area. Is it reasonable to guess this digit? Explain.</p> <p>A friend lives at either 9410 – 82 Street or 9401 – 82 Street. Discuss how easy or difficult it would be to find the correct house.</p> <p><i>Make personal timetables and schedules, e.g., school subjects, study time, leisure time.</i></p> <p><i>Investigate and communicate the practical applications of collecting, organizing and displaying data, e.g., timesheets, log books.</i></p>
<p>General Outcome</p> <p>Use numbers to communicate the probability of single events from experiments, models and everyday experiences.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • analyze and discuss the results of simple probability experiments/ experiences [C, E, PS, R] • demonstrate and/or discuss that different outcomes may occur when repeating the same experiment and/or everyday activity [C, PS, T]. 	<p><i>Use cause and effect strategies when making personal decisions, e.g., if money is spent on a movie, what will the results be?</i></p> <p>There are 23 students in Miss Smith's class. Every morning these students begin the class at 8:35 a.m.</p> <ol style="list-style-type: none"> Discuss two reasons why there may be less than 23 students in class. Discuss two reasons why there may be more than 23 students in class. Discuss two reasons why there may be no students in class. <p>SOLUTION</p> <p>Answers will vary.</p> <ol style="list-style-type: none"> A student may be late or absent. A new student has been added to the class or another class has been invited to watch a presentation. The class could be on a field trip, there was a fire drill, or it is a holiday.

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GRADE 9

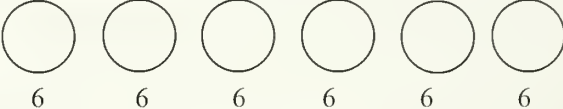
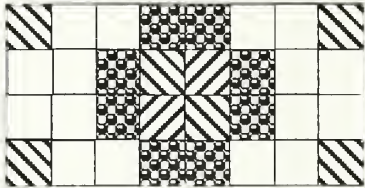
STRAND: Number (Number Concepts and Operations)

Students will:

- estimate and solve everyday problems with whole numbers in home, workplace and community situations using technology as appropriate
- develop and demonstrate number sense to describe quantities, represent numbers in multiple ways, estimate and apply appropriate arithmetic operations.

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Demonstrate a number sense for whole numbers, decimals, percents, common fractions, mixed numbers, ratios, rates and proportions to help solve everyday arithmetic problems.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • estimate quantities, and read and write numerals in the millions [C, CN, E] • round numbers to nearest unit, tenth and hundredth [E, R] 	<p><i>Recognize and understand numbers, from newspapers and other sources, e.g., populations of types of trees in Alberta, large numbers used in the workplace or media, economic trends and GNP of countries.</i></p> <p>Practise writing numbers in both numeric and word forms by writing cheques. See IOP Studio (online guide to implementation).</p> <p>Compare human populations in various countries, prices of homes and vehicles, incomes of favourite singing artists and distances during space travel. Use Internet Web sites such as Statistics Canada, http://www.statcan.ca.</p> <p>Calculate the cost per unit from the list below, round to the nearest cent.</p> <p>a. 2 T-shirts for \$18.99 b. 12 cans of pop for \$3.62</p> <p>SOLUTION</p> <p>a. One T-shirt costs \$9.50 b. One can of pop costs \$0.30</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> describe and demonstrate common multiples, common factors, least common multiples, greatest common factors and prime factorizations using numbers to 100 concretely, pictorially and symbolically [C, PS, R, V] 	<p>A caterer baked 6 pies for a banquet. He divided each pie into 6 pieces to have one piece for each guest. How many guests will be at the banquet?</p> <p>Show each pie divided into 6 pieces.</p>  <p>SOLUTION $6 \text{ pies} \times 6 \text{ pieces per pie} = 36 \text{ pieces for 36 guests.}$</p>
<ul style="list-style-type: none"> demonstrate and explain common proper, improper, and equivalent fractions and mixed numbers concretely, pictorially and symbolically [C, R, V] 	<p><i>Take measurements using a tape measure, ruler or yardstick, e.g., the dimensions of the classroom or workplace area.</i></p> <p>a. What fraction of this quilt does not have a pattern design? Write the answer in simplest form.</p>  <p>b. Write another equivalent fraction for $\frac{16}{32}$.</p> <p>c. Write an equivalent fraction for the centre pattern $\frac{12}{32}$.</p> <p>SOLUTION</p> <p>a. $\frac{16}{32} = \frac{1}{2}$</p> <p>b. Answers will vary.</p> <p>c. Equivalent fractions for $\frac{12}{32}$ are $\frac{6}{16}$, $\frac{3}{8}$.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>																				
<ul style="list-style-type: none"> write multiples of 10 as powers of 10 [C, CN, V] 	<p><i>Recognize large numbers in science and the media, e.g., speeds of light and sound, distances in space, yearly incomes of large corporations.</i></p> <p>Write these city populations as powers of 10 and list them from greatest to least population.</p> <table border="1" data-bbox="569 388 1045 613"> <thead> <tr> <th>City</th><th>Population</th></tr> </thead> <tbody> <tr> <td>A</td><td>32 000 000</td></tr> <tr> <td>B</td><td>14 000 000</td></tr> <tr> <td>C</td><td>980 000</td></tr> <tr> <td>D</td><td>2 300 000</td></tr> </tbody> </table> <p>SOLUTION</p> <table border="1" data-bbox="569 672 1045 897"> <thead> <tr> <th>City</th><th>Population</th></tr> </thead> <tbody> <tr> <td>A</td><td>3.2×10^7</td></tr> <tr> <td>B</td><td>1.4×10^7</td></tr> <tr> <td>D</td><td>2.3×10^6</td></tr> <tr> <td>C</td><td>9.8×10^5</td></tr> </tbody> </table>	City	Population	A	32 000 000	B	14 000 000	C	980 000	D	2 300 000	City	Population	A	3.2×10^7	B	1.4×10^7	D	2.3×10^6	C	9.8×10^5
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<ul style="list-style-type: none"> demonstrate and explain the meaning of percentage and the relationship between percentage and decimals [C, CN, R, V] 	<p>How much did James pay for a \$125 fishing rod that was discounted by 10%?</p> <p>SOLUTION $\\$125 \times 0.1 = \\12.50 $\\$125 - \\$12.50 = \\$112.50$</p>																				
<ul style="list-style-type: none"> demonstrate and explain the meaning of ratios, rates and proportions concretely, pictorially and symbolically [C, CN, R, V] 	<p>The Sun Protection Factor or SPF represents how long you can be safely exposed to sunlight when wearing a SPF protecting product. For example, SPF 2 provides protection for 14 minutes in the sun.</p> <ol style="list-style-type: none"> What is the ratio of SPF to safe sunlight time? How long could you safely stay in the sun wearing an SPF 30? <p>SOLUTION</p> <ol style="list-style-type: none"> Ratio is 2 : 14 min. or 1 : 7. ? min: SPF 30 = 14 min. : SPF 2 If you wore SPF 30 you could stay in the sun for 210 minutes or $3\frac{1}{2}$ hours. 																				

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Solve everyday problems by applying arithmetic operations on whole numbers, decimals and percents.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> estimate and calculate sums, differences, products and quotients to solve everyday problems [E, R, PS, T] estimate and calculate averages (mean) in relation to everyday situations [C, E, R, V] estimate and calculate percents to solve everyday problems [C, E, R, T]. 	<p><i>Estimate and calculate monthly/yearly wages.</i></p> <p><i>Check/clarify paycheque deductions.</i></p> <p><i>Prepare a budget.</i></p> <p><i>Estimate the total on a restaurant bill.</i></p> <p>For a fundraiser, Marc sold 9 chocolate bars at \$3.00 each, 10 almond bars at \$4.00 each, and 6 boxes of cookies at \$5.00 each. How much money did Marc raise?</p> <p>SOLUTION $9 \times \\$3.00 = \\27.00 $10 \times \\$4.00 = \\40.00 $6 \times \\$5.00 = \\30.00 Marc raised \$97.00 for the fundraiser.</p> <p><i>Determine the average cost of lunch over a period of a month.</i></p> <p><i>Determine the average cost of clothing during a school year.</i></p> <p><i>Determine the average income over a period of time for a part-time job.</i></p> <p>What is the average height of these students: Roland is 1.43 m tall, Catherine 1.67 m tall and Jason 1.22 m tall?</p> <p>SOLUTION $(1.43 + 1.67 + 1.22) \div 3 = 4.32 \div 3 = 1.44$ The average height of these students is 1.44 m.</p> <p><i>Estimate GST on purchases.</i></p> <p><i>Calculate the cost of running shoes on sale at 20% off the regular price.</i></p> <p>Bob got 48 correct answers out of 65 on a test. What is Bob's mark in percent?</p> <p>SOLUTION $\frac{48}{65} \times 100 = 73.8 = 74\%$ or as a ratio $48 : 65 \quad \frac{48}{65} = \frac{n}{100}$ $n : 100$</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Solve everyday problems by applying arithmetic operations using fractions and mixed numbers.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> add and subtract fractions and mixed numbers with like denominators [PS, T] generate and verify equivalent fractions to solve problems, involving adding and subtracting fractions with unlike denominators [PS, R, T, V] 	<p><i>Measure ingredients for cooking:</i></p> <p>e.g., $\frac{3}{4}$ cups + $\frac{3}{4}$ cups = $\frac{6}{4} = 1\frac{2}{4}$ cups $\rightarrow 1\frac{1}{2}$ cups</p> <p>Chris wants to make 24 freezer fudgesicles. From the recipe below, write a list of all the ingredients Chris will need.</p> <p style="text-align: center;">Freezer Fudgesicles</p> <p>1 box instant chocolate pudding $2\frac{1}{2}$ cups milk $\frac{1}{2}$ cup sugar Blend ingredients and freeze in molds. Yield: 12 servings</p> <p>SOLUTION</p> <p style="text-align: center;">Freezer Fudgesicles</p> <p>2 box instant chocolate pudding 5 cups milk 1 cup sugar Yield: 24 servings</p> <p>What fraction of students in the class have paid for the field trip if $\frac{1}{2}$ paid on Monday and $\frac{1}{3}$ paid on Tuesday?</p> <p>SOLUTION Equivalent fractions:</p> $\frac{1}{2} = \frac{3}{6}$ $\frac{1}{3} = \frac{2}{6}$ $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

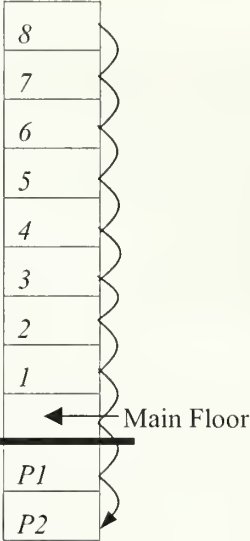
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General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<ul style="list-style-type: none"> multiply and divide proper fractions [PS, T] 	<p><i>Measure and calculate the area of the floor of a room for the purchase of a carpet.</i></p> <p>If $\frac{2}{3}$ of the class ordered pizzas and $\frac{1}{3}$ of those students wanted extra cheese, what fraction of the students ordered pizza with extra cheese?</p> <p>SOLUTION $\frac{1}{2}$ of $\frac{2}{3}$ $\frac{1}{2} \times \frac{2}{3} = \frac{2}{6} = \frac{1}{3}$ of the class ordered pizza with extra cheese.</p>
<ul style="list-style-type: none"> convert fractions into decimal equivalents as appropriate to solve everyday problems [PS, V] 	<p>Sofia works $10\frac{1}{2}$ hours per week. If she makes \$7.00/hour, how much does she earn in one week?</p> <p>SOLUTION $10\frac{1}{2} \rightarrow 10.50$ $10.5 \text{ hours/week} \times \\$7.00/\text{h} = \\$73.50/\text{week}$</p>
<ul style="list-style-type: none"> calculate the lowest common multiple for pairs of numbers less than 10 [PS, R, T] 	<p>Marie is planning her activities. She baby-sits every 2 days and plays soccer every 4 days. After how many days will Marie baby-sit and play soccer on the same day?</p> <p>SOLUTION Multiples of 2 are 2, 4, 6, 8 ... Multiples of 4 are 4, 8, 12 ... She will baby-sit and play soccer on the same day every 8 days.</p>
<ul style="list-style-type: none"> calculate the greatest common factor for pairs of numbers less than 25 [PS, R, T]. 	<p>What is the largest size of stained glass tiles needed to cover a 3-metre by 9-metre window?</p> <p>SOLUTION Factors of 3 are 1 and 3. Factors of 9 are 1, 3 and 9. The largest size of stain glass tiles needed to cover the window is 3 metres by 3 metres.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Solve everyday problems by applying arithmetic operations using rates, ratios, proportions and integers.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • use rates to estimate, calculate and compare prices [C, E, R] • demonstrate an understanding of the concept of scale using ratio and proportion [CN, R] 	<p><i>Compare costs of food, clothing and other everyday items, and make personal decisions about purchasing.</i></p> <p>A store sells helium-filled balloons at 3 for \$2.50. What is the cost if 15 balloons are ordered?</p> <p>SOLUTION Unit price: $\\$2.50 \div 3 = \\0.83 $0.83 \times 15 = \\$12.499 = \\12.50</p> <p><i>Estimate the full-scale size of a replica, such as a model of a building, car or airplane.</i></p> <p>The Pysanka or large Ukrainian egg in Vegreville has a length of 7.8 m and width of 5.5 m. What were the dimensions of the actual egg, to the nearest tenth, if this scale was 1 m:1.2 cm?</p> <p>SOLUTION $7.8 \div 1.2 = .065$ m $5.5 \div 1.2 = .0458 = .046$ m The actual size of the egg was 6.5 cm \times 4.6 cm</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> demonstrate addition/subtraction of pairs of integers between -25 and $+25$ concretely, pictorially and symbolically [V] 	<p><i>Estimate and calculate temperature changes, including changes from below to above zero, e.g., -10 degrees in the morning to $+2$ degrees in mid-afternoon.</i></p> <p>How many floors did Billy travel in the elevator if he got on the elevator on the 8th floor and got off on the 2nd level (P2) of underground parking?</p>  <p>SOLUTION</p> <p>Billy travelled 10 floors in the elevator. See the IOP Studio (online guide to implementation).</p>
<ul style="list-style-type: none"> write number sentences to describe the addition and subtraction of integers [C, R]. 	<p>At 5:15 a.m., the temperature was -15°C. The temperature rose by 5°C two hours later. The temperature continued to rise until it reached the daily high by rising an additional 7°C. At 7:00 p.m. the temperature had fallen by 10°C.</p> <ol style="list-style-type: none"> Write a number sentence to show the change in temperature. Determine the final temperature. What is the difference between the initial and final temperatures? <p>SOLUTION</p> <ol style="list-style-type: none"> $(-15^{\circ}\text{C}) + (5^{\circ}\text{C}) + (7^{\circ}\text{C}) + (-10^{\circ}\text{C})$ The final temperature was -13°C. The difference between the initial and final temperature is 2°C.

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

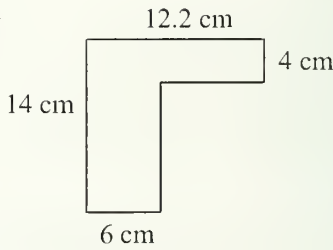
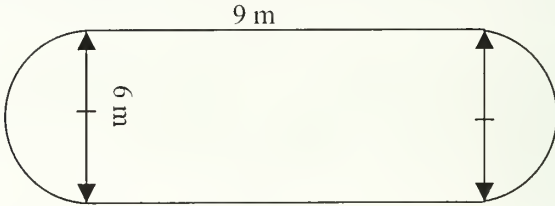
STRAND: Shape and Space (Measurement)

Students will

- estimate and take accurate measurements in everyday metric (SI) and Imperial units of measurement and solve problems at home, in the workplace and community using appropriate measuring devices, strategies and technology
- work individually or as members of a team, communicate mathematically, and investigate the application of measurement knowledge and skills in a variety of careers and workplace situations.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Solve everyday problems involving area, surface area, mass, weight, volume (capacity), and angle measurement.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> use common SI units and instruments to take accurate measurements of length, mass, weight, and (volume) capacity [CN, PS, R] use conversion charts, calculators and/or other tools to compare and convert a variety of metric units [CN] use common Imperial units and instruments to take accurate measurements of length, weight, and (volume) capacity [CN, PS, R] 	<p><i>Cook, measure and renovate at home or help with a community project.</i></p> <p><i>Use a variety of different sized nails. Sort, measure and document the size and quantity.</i></p> <p><i>Understand the relationship between converted units when purchasing meat and other food products, such as g and kg, mL and L.</i></p> <p>If Roger is 1.54 m tall, how tall is he in cm?</p> <p>SOLUTION</p> <p>$1.54 \text{ m} \times 100 \text{ cm/m} = 154 \text{ cm}$</p> <p><i>Use yardsticks and rulers, and the units of yards, feet and inches, when measuring and purchasing for home building and other projects.</i></p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)												
<ul style="list-style-type: none"> use conversion charts, calculators and/or other tools to compare and convert a variety of Imperial units of measure [CN] 	<p><i>Convert feet to inches, and quarts to cups as needed at home and in the workplace.</i></p> <p>An outdoor education instructor bought 9 feet of rope to teach her students how to tie different knots. If there are 8 students in her class, how many inches of rope does each student receive?</p> <p>SOLUTION $9 \text{ feet} \times 12 \text{ inches/foot} = 108 \text{ inches}$ $108 \text{ inches} \div 8 \text{ students} = 13\frac{1}{2} \text{ inches of rope per student}$</p> <p>During a tournament the concession expects to sell 100 cups of orange drink. How many quarts of orange drink should be prepared? (1 quart = 4 cups)</p> <p>SOLUTION $100 \text{ cups} \div 4 \text{ cups/quart} = 25 \text{ quarts}$</p>												
<ul style="list-style-type: none"> estimate, demonstrate and calculate areas of quadrilaterals, triangles and circles [CN, E]. 	<p>Draw the shape on a grid and estimate the area of the pool (1 cm = 1 m).</p>  <p>SOLUTION Estimate $(12 \times 4 \text{ cm}) + (10 \times 6 \text{ cm})$ $(48) + (60) = 108 \text{ m}$</p> <p>Estimate or calculate the area of this pool to the nearest metre.</p>  <p>SOLUTION</p> <table border="0"> <tr> <td>Area of the circle</td> <td>Area of rectangle</td> </tr> <tr> <td>$A = \pi r^2$</td> <td>$A = b \times h$</td> </tr> <tr> <td>$= 3.14 (6 \times 6)$</td> <td>$= 9 \times 6$</td> </tr> <tr> <td>$= 3.14 \times 36$</td> <td>$= 54 \text{ m}^2$</td> </tr> <tr> <td>$= 113.04 \text{ m}^2$</td> <td>Total area = $113.04 \text{ m}^2 + 54 \text{ m}^2$</td> </tr> <tr> <td></td> <td>$= 167.04 \text{ m}^2$</td> </tr> </table>	Area of the circle	Area of rectangle	$A = \pi r^2$	$A = b \times h$	$= 3.14 (6 \times 6)$	$= 9 \times 6$	$= 3.14 \times 36$	$= 54 \text{ m}^2$	$= 113.04 \text{ m}^2$	Total area = $113.04 \text{ m}^2 + 54 \text{ m}^2$		$= 167.04 \text{ m}^2$
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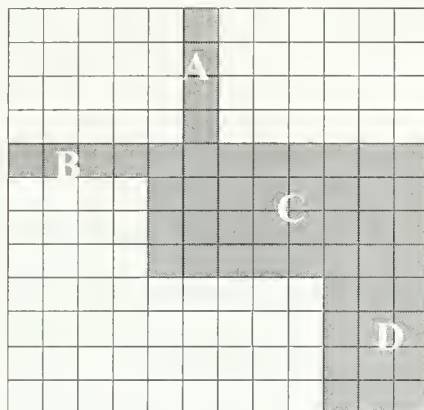
[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes

- estimate and demonstrate perimeters and areas of irregular 2-D shapes using grids [PS, V]

Examples of Everyday Applications and Illustrative Examples (Discretionary)

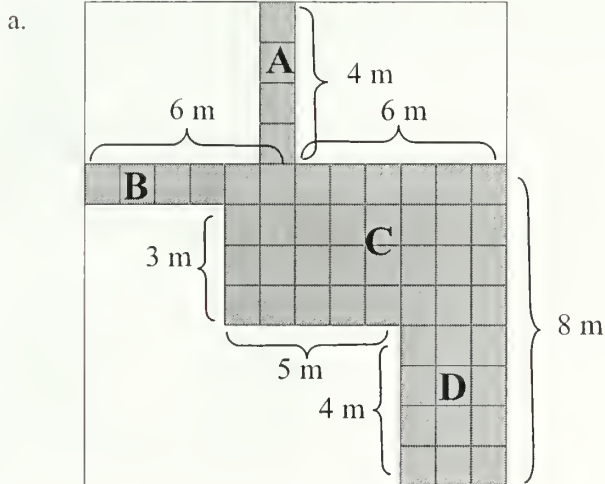
A homeowner has drawn a scale diagram (blueprint) of where he will pour cement for a deck and walkways.



Legend
1 unit = 1 m
■ = area of cement

- If the scale is 1 unit = 1 m, write the dimensions of each length on the diagram in metres.
- Use symbols or another method to determine the total deck and walkway area to be cemented.

SOLUTION



- 52 squares or calculate using the formula for area:
 $A = 4 \times 1 = 4 \text{ m}^2$
 $B = 4 \times 1 = 4 \text{ m}^2$
 $C = 8 \times 4 = 32 \text{ m}^2$
 $D = 3 \times 4 = 12 \text{ m}^2$
 Total = 52 m^2

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> calculate and solve problems involving mass (weight) and volume (capacity) using everyday metric and Imperial units [PS, R] identify and discuss examples of angles in the environment and classify angles, such as right, acute, obtuse, straight or reflex [C, R, V] estimate, measure and draw angles up to 180°, using a protractor or other tools [CN, E]. 	<p><i>Recognize units when replacing air in tires, oil, windshield washer and other fluids in vehicles.</i></p> <p>A farmer has a 900 L fuel tank. If his truck holds 60 L of gasoline, how many times can he fill his truck tank from his fuel tank?</p> <p>SOLUTION $900 \text{ L} \div 60 \text{ L/fill-up} = 15 \text{ fill-ups}$</p> <p><i>Identify and classify angles on bridges, street signs, playground equipment.</i></p> <p><i>Take digital/regular photos of objects around the home or school that have angles or cut pictures from magazines. Classify the angles.</i></p> <p><i>Use appropriate tools and measure accurately when laying tiles or hardwood at home.</i></p> <p>After knee surgery, the patients are ready to go home from the hospital when they can bend their knee at least 100°. Which of these patients is able to go home?</p> <div data-bbox="562 882 990 1391"> </div> <p>SOLUTION Patient D is able to go home.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Solve problems involving the properties of circles and their connections with angles, time and time zones.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • convert between hours and minutes, and between minutes and seconds [CN, R] • add and subtract hours and minutes in appropriate everyday applications [CN, T]. 	<p><i>Record and keep track of hours and days at a volunteer or part-time job.</i></p> <p>How many hours and minutes is a 105-minute movie?</p> <p>SOLUTION $105 \text{ minutes} \times 1 \text{ hour}/60 \text{ minutes} = 1.75 \text{ hours}$ or 1 hour and 45 minutes or $105 - 60 = 45$, 1 hour and 45 minutes.</p> <p><i>Determine travel times of family and workplace trips.</i></p> <p>Mona bought 2 hours of tanning time at a tanning studio. How many minutes does she have left if she has used the following minutes: 3, 3, 4, 4, 8, 4, 10, 10, 12, 12, and 13?</p> <p>SOLUTION $2 \text{ h tanning} \times 60 \text{ minutes/h} = 120 \text{ minutes}$ 83 minutes used $120 - 83 = 37$ minutes of tanning left.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Shape and Space (3-D Objects and 2-D Shapes)

Students will:

- create, analyze and manipulate 3-D objects and 2-D shapes, using transformations, technology and other tools as appropriate to better understand shapes and objects, and their relationship to home, workplace and community environments.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Use visualization and symmetry to solve problems involving classification and sketching of objects and shapes.</p> <p>Specific Outcomes</p> <p>Students will:</p> <ul style="list-style-type: none"> • classify and create 3-D objects, using a variety of strategies and tools [C, R, T, V] • sort quadrilaterals and regular polygons according to the number of lines of symmetry [V] • draw and classify triangles according to the measurements of their angles, e.g., acute, obtuse, scalene [C, CN, V] • illustrate the concept of surface area of 3-D objects 	<p><i>Create a design and build a variety of 3-D objects such as a picture frame, birdhouse, table, or photo box using cardboard, wood, styrofoam or other available building materials.</i></p> <p>Lines of symmetry help balance objects. Identify lines of symmetry of bridges, buildings, windows, doors, tiles.</p> <p>See IOP Studio (online guide to implementation).</p> <p><i>Calculate the amount of paint required to paint the walls and ceiling of a garage.</i></p> <p>You are painting the sides, top and bottom of this toy box. What is the total surface area you will paint to the nearest tenth?</p> <div data-bbox="943 1270 1209 1505"> </div> <p>SOLUTION</p> <p>Side + side = $2 \times 1.8 = 3.6 \text{ m}^2 \times 2 = 7.2 \text{ m}^2$</p> <p>Front + back = $1.2 \times 2.0 = 2.4 \text{ m}^2 \times 2 = 4.8 \text{ m}^2$</p> <p>Top + bottom = $1.2 \times 1.8 = 2.16 \text{ m}^2 \times 2 = 4.32 \text{ m}^2$</p> <p>Total surface area = $7.2 + 4.8 + 4.32 = 16.32 \text{ m}^2$ or 16.3 m^2</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> use scale to reproduce a 2-D shape. 	<p>Create a floor plan of a room or house, sketch a plant, a land location.</p>
<p>General Outcome</p> <p>Create and analyze patterns and designs using congruence, symmetry, translation, rotation and reflection.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> create, analyze and describe designs, using translations (slides), reflections (flips) and rotations (turns) [C, V] 	<p><i>Use a word processor, a draw program, or a grid to demonstrate slides, flips and rotations.</i></p> <p>Laurel is baking heart shaped cookies for the Valentine's Day school party. Use slides, flips or turns to determine the maximum number of cookies she could make using the dough.</p> <div data-bbox="604 799 1252 1019" data-label="Image"> </div> <p>SOLUTION</p> <p>Answers will vary.</p> <div data-bbox="575 1244 698 1283" data-label="Text"> <p>20 cookies</p> </div> <div data-bbox="739 1172 1278 1391" data-label="Image"> </div> <div data-bbox="575 1479 698 1519" data-label="Text"> <p>21 cookies</p> </div> <div data-bbox="748 1430 1287 1650" data-label="Image"> </div>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> identify the single transformation that connects a shape with its image [CN, R, V] use coordinates to describe the position of objects in two dimensions [R, V] trace a path, given in oral or written instructions, and write or describe instructions for a given path [C, PS, R, V] draw designs or determine locations in the first and second quadrants of a coordinate grid, using ordered pairs [R, V]. 	<p>Describe these motions as a reflection (flip), rotation (turn), or translation (slide).</p> <ol style="list-style-type: none"> your image in water shutting off a water tap closing the crisper in the fridge installing a light bulb switching off a wall light switch closing a patio door <p>SOLUTION</p> <ol style="list-style-type: none"> reflection/flip rotation/turn translation/slide rotation/turn reflection/flip translation/slide <p><i>Use maps to plan a road or bus trip.</i></p> <p><i>Understand the layout of a city or town and describe directions to a specific address.</i></p> <p><i>Explain to a new student how to get to the office, gymnasium, cafeteria or next class.</i></p> <p><i>Use specific maps to find your way around a zoo, hotel, historical vacation site or mall.</i></p> <p>Use town, city, provincial and other maps to locate specific addresses.</p> <p>Use the school map to locate exits during fire drills.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Patterns and Relations (Patterns and Relationships)

Students will:

- recognize that patterns and relationships exist in nature and everyday living
- use patterns and relationships to solve everyday problems at home, in the workplace and in the community.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																																																	
<p>General Outcome</p> <p>Use relationships to summarize, generalize and extend patterns to solve everyday problems.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none">make predictions based on everyday living patterns and use patterns to draw conclusions [CN, E]	<p><i>Examine and discuss behaviour of self and others, or other patterns, such as cause and effect situations, at home, school, in the workplace, e.g., what may happen if late for work?</i></p> <p>A researcher wanted to find the best time to go fishing so he spent 6 hours per day fishing, for one month. He recorded the number of fish that he caught and released each day.</p> <table><tr><th colspan="7">July</th></tr><tr><th>Sunday</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th></tr><tr><td>1 3 fish</td><td>2 2 fish</td><td>3 2 fish</td><td>4 1 fish</td><td>5 0 fish</td><td>6 ☉ Full moon 0 fish</td><td>7 0 fish</td></tr><tr><td>8 1 fish</td><td>9 2 fish</td><td>10 2 fish</td><td>11 3 fish</td><td>12 4 fish</td><td>13 6 fish</td><td>14 6 fish</td></tr><tr><td>15 ☾ Half moon 8 fish</td><td>16 11 fish</td><td>17 12 fish</td><td>18 14 fish</td><td>19 17 fish</td><td>20 18 fish</td><td>21 20 fish</td></tr><tr><td>22 ● New moon 23 fish</td><td>23 19 fish</td><td>24 18 fish</td><td>25 15 fish</td><td>26 14 fish</td><td>27 11 fish</td><td>28 10 fish</td></tr><tr><td>29 ☾ Half moon 8 fish</td><td>30 6 fish</td><td></td><td></td><td></td><td></td><td></td></tr></table> <p>a. When was the best day to go fishing? b. When were the worst fishing days? c. What is the pattern between the phase of the moon and the number of fish?</p>	July							Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	1 3 fish	2 2 fish	3 2 fish	4 1 fish	5 0 fish	6 ☉ Full moon 0 fish	7 0 fish	8 1 fish	9 2 fish	10 2 fish	11 3 fish	12 4 fish	13 6 fish	14 6 fish	15 ☾ Half moon 8 fish	16 11 fish	17 12 fish	18 14 fish	19 17 fish	20 18 fish	21 20 fish	22 ● New moon 23 fish	23 19 fish	24 18 fish	25 15 fish	26 14 fish	27 11 fish	28 10 fish	29 ☾ Half moon 8 fish	30 6 fish					
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General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)												
	<p>SOLUTION</p> <p>a. The best fishing day was February 22nd.</p> <p>b. The worst fishing days were February 5, 6 and 7.</p> <p>c. The best fishing is during a new moon and worst fishing is during a full moon.</p>												
<ul style="list-style-type: none"> create expressions and rules to describe, complete and extend patterns and relationships [C, CN, PS, R] 	<p><i>Predict trends, e.g., in a set of graphed data, bus routes, constellations.</i></p> <p>Use the following graph to answer the questions below.</p> <div data-bbox="582 535 1354 1168" data-label="Figure"> <p style="text-align: center;">Enrollment of the Drama Club</p> <table border="1"> <caption>Data for Enrollment of the Drama Club</caption> <thead> <tr> <th>Month</th> <th>Number of Students</th> </tr> </thead> <tbody> <tr> <td>January</td> <td>2</td> </tr> <tr> <td>February</td> <td>4</td> </tr> <tr> <td>March</td> <td>6</td> </tr> <tr> <td>April</td> <td>8</td> </tr> <tr> <td>May</td> <td>10</td> </tr> </tbody> </table> </div> <p>a. How many students were in the Drama Club in January?</p> <p>b. How many students were in the Drama Club in May?</p> <p>c. Has the enrollment increased or decreased?</p> <p>d. Predict how many students will be enrolled in June.</p> <p>e. Explain what happened to the enrollment each month.</p> <p>f. Using the letter s to represent students, give an arithmetic expression that explains the pattern of this graph</p> <p>SOLUTION</p> <p>a. 2</p> <p>b. 10</p> <p>c. Increased</p> <p>d. If the pattern continues, there will be 12 students enrolled in the Drama Club in June.</p> <p>e. The enrollment increased by 2 students each month.</p> <p>f. $s + 2$</p>	Month	Number of Students	January	2	February	4	March	6	April	8	May	10
Month	Number of Students												
January	2												
February	4												
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[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> demonstrate and explain how to solve simple problems, using informal algebraic methods [C, CN, R, V] solve everyday problems using common arithmetic expressions and formulas, such as formulas for perimeter and area [PS, R]. 	<p><i>If the regular price, r, of an item is reduced by seven dollars, the sale price could be represented as $r - 7$.</i></p> <p>Goods and services are taxed at 7% in Alberta. The total price of the good or service, T, could be represented as $T = (0.07p) + p$. Let T = Total price p = price</p> <p><i>Calculate materials/supplies needed when covering floors, painting walls, replacing baseboards, seeding a lawn, spraying a crop.</i></p> <p><i>Use arithmetic expressions and formulas to explain the measurements for covering floors, painting walls, replacing baseboards, seeding a lawn, spraying a crop.</i></p> <p>The formula for speed, S, is $S = \frac{d}{t}$, where d represents distance and t represents time. If a car travels 250 km for 2.6 hours, what is the speed of the car?</p> <p>SOLUTION 96 km/h</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Statistics and Probability (Collecting and Analyzing Information)

Students will:

- collect and/or generate data
- display data and other information related to home, workplace and community applications, using a variety of strategies
- interpret, analyze and maintain data, charts, graphs and other records for personal use
- use probability, chance, and predictions when planning and making everyday decisions.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																					
<p>General Outcome</p> <p>Collect, display and analyze information and data for everyday applications.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none">• use appropriate vocabulary related to home or workplace to discuss and analyze data, such as probable/improbable, equally likely/less likely/more likely, best/worst [C, CN]	<p><i>Perform real/simulated basic banking operations, such as deposits and transfers, and fill in appropriate forms.</i></p> <p><i>Define and calculate service charges, e.g., bank statements, gratuities.</i></p> <p><i>Examine and analyze a variety of contracts, e.g., DVD and CD mail order companies.</i></p> <p>Use the graph to answer the following questions.</p> <div><p style="text-align: center;">Comparison of Cell Phone Rates</p><table><thead><tr><th>Number of Minutes x 100</th><th>Option A Cost (\$)</th><th>Option B Cost (\$)</th></tr></thead><tbody><tr><td>1</td><td>10</td><td>40</td></tr><tr><td>2</td><td>10</td><td>40</td></tr><tr><td>3</td><td>10</td><td>40</td></tr><tr><td>4</td><td>30</td><td>40</td></tr><tr><td>5</td><td>50</td><td>50</td></tr><tr><td>6</td><td>70</td><td>60</td></tr></tbody></table></div> <p>a. Which cell phone option is better for a person who does not make many calls?</p> <p>b. Which cell phone option is better for a person who makes many calls?</p> <p>c. At how many minutes do both of these options cost the same?</p> <p>d. Which cell phone option would you buy? Explain.</p> <p>SOLUTION</p> <p>a. Option A.</p> <p>b. Option B.</p> <p>c. Both phones cost the same at 500 minutes.</p> <p>d. Answers will vary.</p>	Number of Minutes x 100	Option A Cost (\$)	Option B Cost (\$)	1	10	40	2	10	40	3	10	40	4	30	40	5	50	50	6	70	60
Number of Minutes x 100	Option A Cost (\$)	Option B Cost (\$)																				
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3	10	40																				
4	30	40																				
5	50	50																				
6	70	60																				

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<ul style="list-style-type: none"> analyze the distribution of a set of data, using range and measures of central tendency, include terms such as mode, median and mean (average) [CN, R, PS, T] determine trends by identifying and analyzing extremes, gaps or clusters in a set of data [R] organize and display data and information by hand and/or using technology in a variety of ways, including: tables, charts; bar or line graphs; frequency diagrams; broken-line graphs [C, CN, T, V] 	<p>Daryl got the following marks on his first 7 math exams: 62%, 65%, 60%, 67%, 65%, 66% and 62%.</p> <ol style="list-style-type: none"> Arrange the numbers from least to greatest to determine the median score. What is the mode? Calculate the mean. Round to the nearest percent. What is the range? <p>SOLUTION</p> <ol style="list-style-type: none"> 60%, 62%, 62%, 65%, 65%, 66%, 67% Median is 65% Mode is 65% Mean: $60 + 62 + 62 + 65 + 65 + 66 + 67 = \frac{447}{7} = 63.8 = 64\%$ Range is 60 to 67 <p><i>Read and interpret graphs, charts, meters, gauges at home and in the workplace, e.g., graphs from power and gas suppliers. See IOP Studio (online guide to implementation).</i></p> <p><i>Add data and information to life/work-related forms/charts, such as timesheets, budgets and invoices.</i></p> <p><i>Maintain personal finance records/budgets, including debit transactions and cheque deposits.</i></p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes

**Examples of Everyday Applications
and Illustrative Examples (Discretionary)**

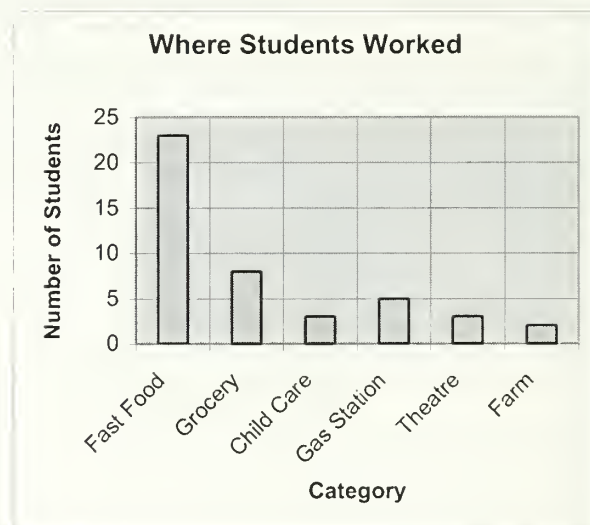
Tammy surveyed 67 students to find out if they had jobs, and where they work. Below are the results of her survey.

Where Students Worked

Category	# of students
Fast Food	23
Grocery	8
Child Care	3
Gas Station	5
Theatre	3
Farm	2
Total	44

Draw a bar graph of the results.

SOLUTION



[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
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- manipulate data in everyday applications at home or in the workplace by selecting appropriate tools such as spreadsheets [C, CN, T]

Use spreadsheets to develop a budget or take inventory at the workplace.

Fill in invoices and sales slips at the workplace.

Camille creates a budget using the amount of money she earns. Use a spreadsheet to calculate the difference between her budget and the amounts she spent.

Camille's Budget			
Category	Budgeted Amount	Actual Amount Spent	Difference
Clothes	\$32	\$45	-\$13
Music	\$24	\$15	+\$9
Food	\$8	\$8	0
Movies	\$6	\$10	-\$4
Total	\$70	\$78	-\$8

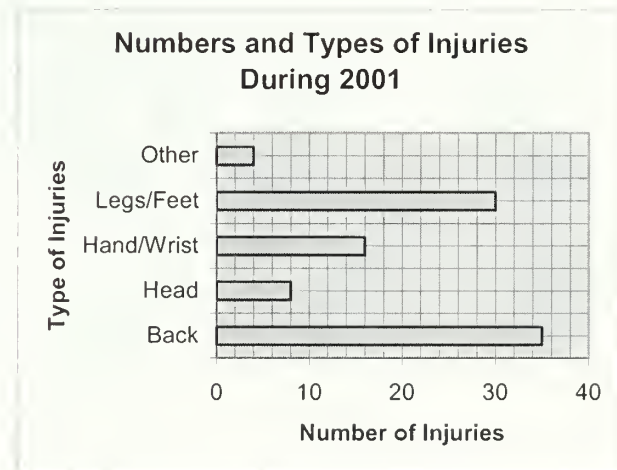
- use and organize files and directories using computers and/or other tools [R, T]
- make conclusions/predictions based on data/information analysis [R].

Create various folders to organize e-mails received from people.

Organize favourite Web sites into folders, e.g., job searches, career information, math help, science sites.

Analyze charts, timesheets, tables and spreadsheets in the workplace.

Use the graph to answer the following questions.



- Which injuries are the most common?
- How many leg or feet injuries were there during 2001?
- Write a conclusion statement about the data.
- Write a prediction for injuries during 2002.







SOLUTION

- Back injuries
- 30

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Number (Number Concepts and Operations)

- estimate and solve problems with numbers, money, decimals, percents, fractions, ratios and proportion in everyday home, workplace and community situations, using technology as appropriate
- develop and demonstrate number sense to describe quantities, represent numbers in multiple ways, and apply appropriate arithmetic operations.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Develop and demonstrate a sense of numbers for whole numbers, decimals, common fractions and integers used in everyday living.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> demonstrate and describe proper/improper fractions, equivalent fractions and mixed numbers through the use of diagrams, symbols, manipulatives and/or technology [C, CN, R, V] 	<p>Put the following sizes of drill bits in order from smallest to largest: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{2}$, $\frac{1}{10}$</p> <p>SOLUTION</p> <p>$\frac{1}{10}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{2}$</p> <p>Match the nuts with the correct bolts.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  $1\frac{5}{8}$ inches </div> <div style="text-align: center;">  $1\frac{1}{8}$ inches </div> <div style="text-align: center;">  $1\frac{1}{4}$ inches </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  $\frac{5}{4}$ inches </div> <div style="text-align: center;">  $\frac{9}{8}$ inches </div> <div style="text-align: center;">  $\frac{13}{8}$ inches </div> </div> <p>SOLUTION</p> <p>$1\frac{5}{8} = \frac{13}{8}$, $1\frac{1}{8} = \frac{9}{8}$, $1\frac{1}{4} = \frac{5}{4}$</p>
<ul style="list-style-type: none"> demonstrate and explain the meanings of and relationships among fractions, decimals and percents concretely, pictorially and symbolically [C, CN, R, V] 	<p>Collect ads in the media and compare sales of a variety of items, e.g., $\frac{1}{3}$ off, 20% off.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

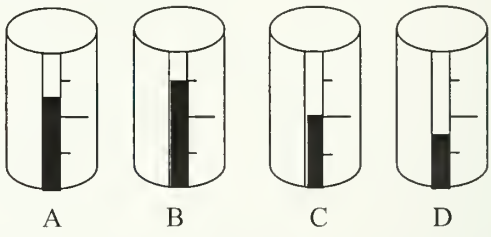
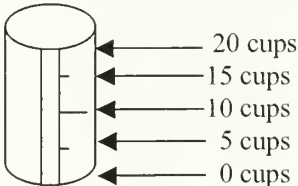
General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																														
<ul style="list-style-type: none">demonstrate and explain the meaning of integers in everyday contexts concretely, pictorially and symbolically [C, CN, R, V].	Update Sam’s bankbook balance. Deposits are positive numbers and expenses are negative numbers.																														
	<table><tr><th>Date</th><th>Description of Transaction</th><th>Expenses</th><th>Deposits</th><th>Balance</th></tr><tr><td></td><td></td><td></td><td></td><td>+\$43.13</td></tr><tr><td>09/05</td><td>Baby-sitting deposit</td><td></td><td>+ 9.00</td><td>+\$52.13</td></tr><tr><td>09/6</td><td>Clothing</td><td>−\$56.78</td><td></td><td>−\$4.65</td></tr><tr><td>09/12</td><td>Allowance</td><td></td><td>+30.00</td><td>+\$25.35</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>	Date	Description of Transaction	Expenses	Deposits	Balance					+\$43.13	09/05	Baby-sitting deposit		+ 9.00	+\$52.13	09/6	Clothing	−\$56.78		−\$4.65	09/12	Allowance		+30.00	+\$25.35					
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<p>General Outcome</p> <p>Solve everyday problems by applying arithmetic operations to whole numbers, decimals, percents, common fractions and integers.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none">assess the reasonableness of calculations and problem solving strategy applied, using a variety of tools and/or strategies such as estimation, charts, graphs, calculators and/or computers [R, T, V]	<p>Debbie is a courier. She delivers packages and letters that must be sent quickly and safely from one office to another.</p> <table><tr><th colspan="4">Estimated Distances and Times Between the Dispatch Office and Buildings A, B, C, D and E</th></tr><tr><th>Route</th><th>Distance (km)</th><th>Time (minutes)</th><th># of packages</th></tr><tr><td>Dispatch to A</td><td>3.0</td><td>15</td><td>2</td></tr><tr><td>A to B</td><td>2.2</td><td>20</td><td>3</td></tr><tr><td>B to C</td><td>6.4</td><td>68</td><td>4</td></tr><tr><td>C to Dispatch</td><td>6.5</td><td>85</td><td>0</td></tr></table> <p>a. If she left Dispatch at 9:15 when will she return?</p> <p>b. How many kilometres will she travel during her shift (round to the nearest kilometre)?</p> <p>c. She is paid \$0.40 per kilometre travelled and \$6.00 per package delivered. How much money will she earn?</p> <p>d. Predict why it took Debbie 68 minutes to travel 6.4 km from B to C and 85 minutes to travel 6.5 km from C to Dispatch.</p> <p>SOLUTION</p> <p>a. 188 minutes = 3 hours and 15 minutes (approx.) 9:15 + 3 h 15 min. = 12:30 p.m.</p> <p>b. 18.1 km = 18 km</p> <p>c. $0.40 \times 18.1 \text{ km} = \\7.24 $6.00 \times 9 \text{ pkgs.} = \\54.00 Total = \$61.24</p> <p>d. Answers may vary, e.g., hills, traffic, she may have rested.</p>	Estimated Distances and Times Between the Dispatch Office and Buildings A, B, C, D and E				Route	Distance (km)	Time (minutes)	# of packages	Dispatch to A	3.0	15	2	A to B	2.2	20	3	B to C	6.4	68	4	C to Dispatch	6.5	85	0
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[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> solve everyday problems using whole numbers, decimals and percents [CN, PS] 	<p><i>Calculate pay and hours worked, GST, income taxes, percent off sales, percent interest on loans.</i></p> <p><i>Use decimals to solve for area and perimeter when seeding a lawn or building a fence.</i></p> <p><i>Recognize that \$1.2 M is \$1 200 000.</i></p> <p>Frank works as a server in a restaurant. A customer's food cost him \$18.78.</p> <ol style="list-style-type: none"> Calculate the GST. An average tip would be 14% or double the amount of GST. Estimate the amount of the tip. <p>SOLUTION</p> <ol style="list-style-type: none"> $\\$18.78 \times 0.07 = \\1.31 GST $\\$1.31 \times 2 = \\2.62 Tip <p>Peter, an apprentice chef, purchases his own chef knife at a cost of \$175.00.</p> <ol style="list-style-type: none"> Peter made a 15% down payment on the knife. How much was the down payment? How much is left owing on the knife? After the down payment, Peter will make 12 payments of \$14. Calculate the total amount paid in monthly payments. Explain why Peter paid a total of \$194.25 for the knife. <p>SOLUTION</p> <ol style="list-style-type: none"> $\\$175 \times 0.15 = \\26.25 $\\$175 - \\$26.25 = \\$148.75$ $12 \text{ payments} \times \\$14 = \\$168.00$ Interest on loan.
<ul style="list-style-type: none"> calculate decimal and percent equivalents for everyday fractions, such as halves, quarters and tenths [R, V] 	<p><i>Estimate sale prices, e.g., $\frac{1}{3}$ off, 15% off.</i></p> <p>Morris works in the paint department of a hardware store. To make a certain colour of paint the guide indicates a mixture of $\frac{1}{2}$ of white, $\frac{1}{4}$ of light yellow, $\frac{1}{10}$ of dark yellow, $\frac{1}{10}$ of blue, and $\frac{1}{20}$ of purple.</p> <ol style="list-style-type: none"> Change each of these fractions to decimal form. Morris needs to mix 2 L of paint. How many litres of each colour are required? <p>SOLUTION</p> <ol style="list-style-type: none"> white = $\frac{1}{2} = 0.50$, lt. yellow = $\frac{1}{4} = 0.25$, dk. yellow = $\frac{1}{10} = 0.10$, blue = $\frac{1}{10} = 0.10$, purple = $\frac{1}{20} = 0.05$ white = 1 L, lt. yellow = 0.50 L, dk. yellow = 0.2 L, blue = 0.2 L, purple = 0.10 L

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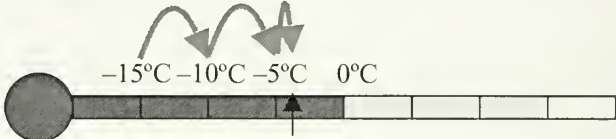
General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> add, subtract, multiply and divide proper fractions and mixed numbers to solve everyday problems [CN, PS] 	<p><i>Determine the cost of merchandise on sale.</i> <i>Increase the yields of recipes, e.g., double a recipe that requires $2\frac{3}{4}$ c of flour.</i></p> <p>A door is 7 feet tall. A hinge is installed one-third of the height from the top. How many feet from the top of the door will the hinge be installed?</p> <p>SOLUTION $7 \text{ feet} \times \frac{1}{3} = \frac{7}{3} = 2\frac{1}{3} \text{ feet}$</p> <p>Sue works in a restaurant and one of her duties is to monitor and fill the coffee cylinders. This diagram represents the levels of coffee in 4 coffee cylinders.</p>  <p>a. What is the fraction of coffee in each coffee cylinder? b. If all of the coffee was combined, approximately how many full cylinders would there be? c. What is the total amount of coffee? d. Sue's supervisor would like to know how many coffee cylinders are less than $\frac{2}{3}$ full. What is the correct answer? e. If each full cylinder holds 20 cups of coffee, how many cups of coffee are there in total?</p> <p>SOLUTION</p> <p>a. $A = \frac{2}{3}, B = \frac{3}{4}, C = \frac{1}{2}, D = \frac{1}{3}$ b. 2 c. $2\frac{1}{4}$ d. 2 e. $2\frac{1}{4}$ cylinders of coffee 1 cylinder + 1 cylinder + $\frac{1}{4}$ cylinder 20 cups + 20 cups + 5 cups = 45 cups</p> 

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General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																																													
<ul style="list-style-type: none">relate integers to life/work situations [CN, R, V]	<p>Bank deposits/withdrawals, golf scores, temperatures.</p> <p>A stock began trading at \$3.50 per share on Monday. Throughout the week the price changed.</p> <p>Tracking the Share Price of Drionthorp Industries</p> <table><tr><th>Day</th><th>Change in Share Price</th><th>Share Price</th></tr><tr><td></td><td></td><td>\$3.50</td></tr><tr><td>Monday</td><td>+\$2.11</td><td>\$5.61</td></tr><tr><td>Tuesday</td><td>−\$0.26</td><td>\$5.35</td></tr><tr><td>Wednesday</td><td>−\$0.75</td><td>\$4.60</td></tr><tr><td>Thursday</td><td>+\$0.15</td><td>\$4.75</td></tr><tr><td>Friday</td><td>−\$1.90</td><td>\$2.85</td></tr></table> <ul style="list-style-type: none">Use the table to determine the cost per share at the end of this week.If an investor had 800 shares, how much money would he have if he sold on Monday? On Friday?What is the difference between selling the shares on Monday instead of Friday? <p>SOLUTION</p> <ul style="list-style-type: none">\$2.85$800 \times \\$5.61 = \\$4488$ $800 \times \\$2.85 = \\2280$\\$4488 - \\$2280 = \\$2208$ <p>On a standard 18-hole golf course a golfer is allowed to make a total of 72 strokes to “make par.” Less than 72 strokes is “under par.” More than 72 shots is “over par.”</p> <ul style="list-style-type: none">Use the results from this golf score sheet to rank these players in order from first to last place. <p>Results After 2 Rounds of Golf</p> <table><tr><th>Player</th><th>Score</th></tr><tr><td>Chris</td><td>5 over par</td></tr><tr><td>Frank</td><td>6 under par</td></tr><tr><td>Cindy</td><td>10 over par</td></tr><tr><td>Sam</td><td>9 under par</td></tr><tr><td>Michelle</td><td>2 under par</td></tr></table> <table><tr><th>Rank Order</th><th>Player</th></tr><tr><td>1</td><td>Sam</td></tr><tr><td>2</td><td>Frank</td></tr><tr><td>3</td><td>Michelle</td></tr><tr><td>4</td><td>Chris</td></tr><tr><td>5</td><td>Cindy</td></tr></table> <ul style="list-style-type: none">What is the number of strokes made by the 1st place golfer? The 5th place golfer? <p>SOLUTION</p> <ul style="list-style-type: none">See table.1st place golfer = $72 - 9 = 63$ strokes 5th place golfer = $72 + 10 = 82$ strokes	Day	Change in Share Price	Share Price			\$3.50	Monday	+\$2.11	\$5.61	Tuesday	−\$0.26	\$5.35	Wednesday	−\$0.75	\$4.60	Thursday	+\$0.15	\$4.75	Friday	−\$1.90	\$2.85	Player	Score	Chris	5 over par	Frank	6 under par	Cindy	10 over par	Sam	9 under par	Michelle	2 under par	Rank Order	Player	1	Sam	2	Frank	3	Michelle	4	Chris	5	Cindy
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<ul style="list-style-type: none">compare and order integers [CN, R, V]																																														

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General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> add and subtract integers used in everyday life. 	<p><i>Determine increase or decrease in temperature over time.</i></p> <p>The temperature at 7:00 a.m. was -15°C. If the temperature was -4°C at 1:15 p.m., what was the change in temperature?</p>  <p>SOLUTION The change in temperature was 11°C.</p>
<p>General Outcome</p> <p>Solve everyday problems by applying the concepts of rate, ratio, and proportion.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> estimate and calculate the unknown value in ratios, rates and proportions used in everyday life [E, PS, R] calculate and compare rates and unit prices by writing ratios that involve numbers with different units [CN, PS, R] use the concepts of ratio and proportion to estimate/determine actual measurements from scale drawings and scale models [CN, E] 	<p><i>Calculate the amount of gasoline used on motor trips.</i></p> <p>Teri wants to have a pond in her yard with a volume of 40 m^3. A front end loader holds 2 cubic metres of soil per load.</p> <ol style="list-style-type: none"> How many loads will the front end loader use to dig a 40 m^3 hole? The loader charges \$16.25 per load. How much will this cost Teri? <p>SOLUTION</p> <ol style="list-style-type: none"> $40\text{ m}^3 \div 2\text{ m}^3 = 20$ loads $\\$16.25 \times 20 = \\325.00 <p>See IOP Studio (online guide to implementation).</p> <p><i>Demonstrate comparative shopping skills, e.g., if four items cost \$2.50 and three items cost \$1.95, which is the better buy?</i></p> <p>A 2-stroke engine guide recommends a fuel ratio of 12 parts gasoline to 1 part oil.</p> <ol style="list-style-type: none"> Write this in a ratio. How many millilitres of oil should be added to 48 mL of gasoline? <p>SOLUTION</p> <ol style="list-style-type: none"> 12 gasoline to 1 oil; 12:1 $\frac{? \text{ mL oil}}{1 \text{ mL oil}} = \frac{48 \text{ parts gasoline}}{12 \text{ parts gasoline}}$ $? = 48 \div 12 = 4 \text{ mL of oil}$ <p><i>Use maps and scales to determine distances when travelling to workplace sites, on vacation, to visit a friend in another community.</i></p> <p>See IOP Studio (online guide to implementation).</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																																
<p>General Outcome</p> <p>Develop a number sense of powers, demonstrate how exponents can bring meaning to large numbers used in everyday living, and use technology to solve problems using these numbers.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none">determine the value of a power, using a whole number base, with exponents of 2 and 3 [CN, R, V]	<p><i>Recognize that 4000 can be represented as 4×10^3.</i></p> <p><i>Recognize that 10 000 can be represented as 10^4.</i></p> <p>Storing food properly is important. Bacteria can double in population in very short periods of time. This type of growth is called exponential growth and can be expressed as an exponent.</p> <p>The chart below shows a type of bacteria that doubles in population every 20 minutes. It is dangerous in food in levels greater than 60 000/mL. Use the chart below to determine approximately how long it would take for this food sample to reach dangerous levels and cause food poisoning.</p> <table><tr><th>Exponent</th><th>Expanded Form</th><th>Bacteria/mL</th><th>Time Elapsed (min.)</th></tr><tr><td>5^1</td><td>$= 5$</td><td>$= 5$</td><td>20</td></tr><tr><td>5^2</td><td>$= 5 \times 5$</td><td>$= 25$</td><td>40</td></tr><tr><td>5^3</td><td>$= 5 \times 5 \times 5$</td><td>$= 125$</td><td>60</td></tr><tr><td>5^4</td><td>$= 5 \times 5 \times 5 \times 5$</td><td>$= 625$</td><td>80</td></tr><tr><td>5^5</td><td>$= 5 \times 5 \times 5 \times 5 \times 5$</td><td>$= 3\,125$</td><td>100</td></tr><tr><td>5^6</td><td>$= 5 \times 5 \times 5 \times 5 \times 5 \times 5$</td><td>$= 15\,625$</td><td>120</td></tr><tr><td>5^7</td><td>$= 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5$</td><td>$= 78\,125$</td><td>140</td></tr></table> <p>SOLUTION</p> <p>It would take between 120 to 140 minutes or 2 h to 2 h 20 minutes for this population to reach dangerous levels causing food poisoning.</p> <p><i>Understand distances and speeds in space travel.</i></p> <p>A company declared a profit of $\\$3.2 \times 10^7$. What is the profit in numerical form?</p> <p>SOLUTION</p> <p>$\\$3.2 \times 10^7 = \\$32\,000\,000 = \\$32\text{ million}$</p>	Exponent	Expanded Form	Bacteria/mL	Time Elapsed (min.)	5^1	$= 5$	$= 5$	20	5^2	$= 5 \times 5$	$= 25$	40	5^3	$= 5 \times 5 \times 5$	$= 125$	60	5^4	$= 5 \times 5 \times 5 \times 5$	$= 625$	80	5^5	$= 5 \times 5 \times 5 \times 5 \times 5$	$= 3\,125$	100	5^6	$= 5 \times 5 \times 5 \times 5 \times 5 \times 5$	$= 15\,625$	120	5^7	$= 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5$	$= 78\,125$	140
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5^5	$= 5 \times 5 \times 5 \times 5 \times 5$	$= 3\,125$	100																														
5^6	$= 5 \times 5 \times 5 \times 5 \times 5 \times 5$	$= 15\,625$	120																														
5^7	$= 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5$	$= 78\,125$	140																														

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Shape and Space (Measurement)

Students will:

- estimate and take accurate measurements in everyday metric (SI) and Imperial units of measurement and solve problems at home, in the workplace and community using appropriate measuring devices, strategies and technology
- working individually or as members of a team, communicate mathematically and investigate the application of measurement knowledge and skills in a variety of careers and workplace situations.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																		
General Outcome Solve everyday problems by estimating, measuring and comparing using decimal numbers or fractions, using tools with Imperial and metric units. Specific Outcomes <i>Students will:</i> <ul style="list-style-type: none">• select and use units and measurement tools that are appropriate in home and work-related experiences [C, R, V]• measure within acceptable degrees of accuracy [CN, R]	<p><i>Use torque wrenches, pressure gauges, rulers, measuring tapes, micrometres, callipers as appropriate at home and in the workplace.</i></p> <p>Interview people and record their job title and description of their work. List the measuring tools used in their jobs.</p> <p>A tire gauge is used to measure pressure in pounds per square inch or “psi.” A gauge must never be over-pressurized and there are different gauges for different tires, e.g. bike, car or heavy equipment.</p> <p style="text-align: center;">Comparison of Tire Gauges</p> <table><tr><th>Gauge</th><th>Range</th><th>Measure of Accuracy</th></tr><tr><td>15 psi</td><td>0–15</td><td>± 0.4</td></tr><tr><td>30 psi</td><td>0–30</td><td>± 0.4</td></tr><tr><td>60 psi</td><td>0–60</td><td>± 1.1</td></tr><tr><td>100 psi</td><td>0–100</td><td>± 1.75</td></tr><tr><td>160 psi</td><td>0–160</td><td>± 2.5</td></tr></table>	Gauge	Range	Measure of Accuracy	15 psi	0–15	± 0.4	30 psi	0–30	± 0.4	60 psi	0–60	± 1.1	100 psi	0–100	± 1.75	160 psi	0–160	± 2.5
Gauge	Range	Measure of Accuracy																	
15 psi	0–15	± 0.4																	
30 psi	0–30	± 0.4																	
60 psi	0–60	± 1.1																	
100 psi	0–100	± 1.75																	
160 psi	0–160	± 2.5																	

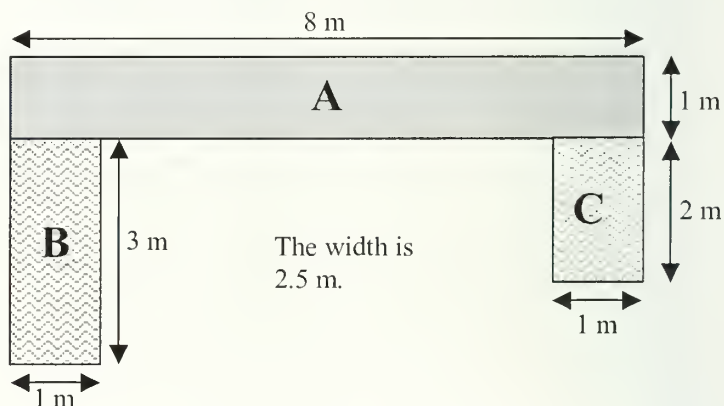
[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
	<p>a. Indicate which tire gauge you would use for each of these tires.</p> <ol style="list-style-type: none"> A typical car tire has an air pressure of 32 psi. Light truck tires have an air pressure of 50 psi. Wide-load tires on semi-truck have an air pressure of 120 psi. Mountain bicycle tires have an air pressure of 50 psi. Racing bicycle tire have an air pressure of 80 psi. <p>b. The column on the table called “measure of accuracy” indicates how accurate the reading will be. Give the range of accuracy for each of these readings.</p> <ol style="list-style-type: none"> 30 psi 60 psi 15 psi <p>c. If a tire has an unknown pressure, what would be the best way to test the pressure of this tire?</p> <p>d. Read the approximate tire pressure on this tire gauge. Is this an acceptable tire pressure for a typical car?</p> <div data-bbox="681 701 1225 1040"> <p style="text-align: center;">Tire Gauge</p> </div> <p>SOLUTION</p> <p>a.</p> <ol style="list-style-type: none"> 60 psi 60 psi 160 psi 60 psi 100 psi <p>b.</p> <ol style="list-style-type: none"> 29.6 to 30.4 58.9 to 61.1 14.6 to 15.4 <p>c. If pressure is unknown use a gauge with a higher pressure range first, e.g., 160 psi. Once the approximate pressure has been determined then select the appropriate gauge.</p> <p>d. Yes, 32 psi, is an acceptable tire pressure for a typical car.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> compare, convert and apply SI units as appropriate in everyday living [CN, R, T] 	<p><i>Convert and compare when cooking at home, measuring ingredients at a bakery or at a restaurant.</i></p> <p>To avoid dehydration during a tournament, Cynthia filled her 500 mL water bottle 4 times. How many litres of water did she drink during the day?</p> <p>SOLUTION $500 \text{ mL} \times 4 = 2000 \text{ mL} = 2 \text{ L}$</p> <p>How many grams are there in a multivitamin that has 160 mg of calcium, 30 mg of potassium, 12 mg of iron, 95 mg of vitamin C, and 130 mg of phosphorus.</p> <p>SOLUTION $160 + 30 + 12 + 95 + 130 = 427 \text{ mg} = 0.427 \text{ g}$</p> <ul style="list-style-type: none"> compare, convert and apply Imperial units of measurement, as appropriate in everyday living [CN, R, T] <p><i>Purchase lumber for a home building project.</i></p> <p>Louise purchased three lengths of rope, 23 inches, 13 inches and 45 inches. How many feet of rope does she have?</p> <p>SOLUTION $23 + 13 + 45 = 81 \text{ inches}$ $81 \text{ inches} \div 12 \text{ inches/foot} = 6.75 \text{ feet or } 6\frac{3}{4} \text{ feet}$</p> <ul style="list-style-type: none"> solve problems involving perimeter, area, volume/capacity and mass [CN, PS, R, T] <p><i>Apply appropriate skills and strategies when determining requirements for simple construction or repair projects, e.g., area—paint needed for walls and a ceiling; perimeter—to purchase fencing materials.</i></p>





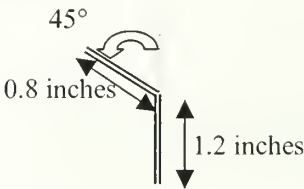
Construction Plans for a Sewage System Repair



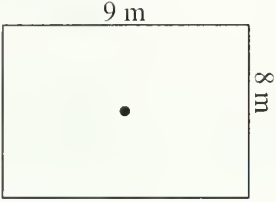
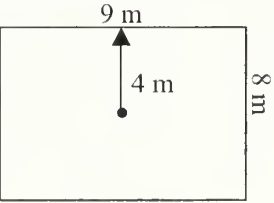
[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<ul style="list-style-type: none"> estimate and measure temperature and calculate changes in temperature [E, PS] use conversion charts, calculators and/or other tools to compare and convert common SI and Imperial units, as required in everyday living [CN, PS, R, T] 	<p>Calculate the approximate volume of dirt removed from this ditch with a front-end loader.</p> $V = lwh$ $V_{\text{total}} = V_A + V_B + V_C$ <p>SOLUTION Calculate total volume.</p> $V = lwh$ $V_A = 8 \times 2.5 \times 1 = 20 \text{ m}^3$ $V_B = 1 \times 2.5 \times 3 = 7.5 \text{ m}^3$ $V_C = 1 \times 2.5 \times 2 = 5 \text{ m}^3$ $V_{\text{total}} = V_A + V_B + V_C = 20 + 7.5 + 5 = 32.5 \text{ m}^3$ <p>Dalmer fires ceramic tiles in a kiln. The tiles fire for 27 hours at a temperature of 1975°F. After firing, the temperature drops to 345°F. How much has the kiln cooled?</p> <p>SOLUTION $1975 - 345 = 1630^\circ\text{F}$</p> <p><i>Use conversion charts in cookbooks and in manuals.</i> See IOP Studio (online guide to implementation).</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Solve problems involving angle measurements.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> estimate the measures of angles in a diagram [E] measure and draw angles using straight edge and protractor [CN, R]. 	<p>Estimate the angle indicated for each of these satellite dishes.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>a.</p>  </div> <div style="text-align: center;"> <p>b.</p>  </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>c.</p>  </div> <div style="text-align: center;"> <p>d.</p>  </div> </div> <p>SOLUTION</p> <p>a. 90°, b. 45°, c. 135°, d. 180°</p> <p>A machinist is creating a tool that is 2 inches long, with a bend of 0.8 inches and an angle of 45°. Draw this tool.</p> <p>SOLUTION</p> 

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Solve problems involving the properties of circles and their connections with angles and time zones.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> estimate and measure diameters, radii and circumferences of circles, and recognize the relationships among them [CN, R] calculate the unknown when given circumference, diameter and/or radii of a circle [PS, T] estimate and calculate the area of a circle [E, PS]. 	<p>A dog owner has a fenceless yard with dimensions 9 m by 8 m.</p>  <p>a. The owner plans to attach a leash to a stake at the centre of the yard. What leash length will keep the dog within the fence line and give it the maximum amount of space to move?</p> <p>b. What is the circumference of the largest circle the dog could make?</p> <p>c. What is the area of the circle that the dog has to move around in? Round to the nearest metre.</p> <p>SOLUTION</p> <p>a. The length of the leash should be 4 m long.</p>  <p>b. $C = 2\pi r$ $= 2 \times 3.14 \times 4$ $= 25.12 \text{ m}$ $= 25 \text{ m}$</p> <p>c. $A = \pi r^2$ $= 3.14 \times 4 \times 4$ $= 50.24 \text{ m}^2$ $= 50 \text{ m}$</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Solve problems involving time.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> define such concepts of time as start time, stop time, elapsed time, overtime, double time, time-and-a-half [C, CN, R] add and subtract hours and minutes in applications [CN, PS]. 	<p><i>Determine hours worked for each time period and cross-check with paycheques.</i></p> <p>Lucy is paid \$6.50 per hour for regular hours and double time for overtime hours. If she worked 40 regular hours and 3 overtime hours, how much did she earn this week?</p> <p>SOLUTION $\\$6.50 \times 40 \text{ hours} = \\260 $\\$6.50 \times 2 \times 3 \text{ overtime hours} = \\39 Total = \$299</p> <p><i>Determine travel times of workplace, community and vacation trips.</i></p> <p>Gary is making a long distance call to New Zealand, which is 18 hours ahead of his time. If he called at 6:00 p.m. on a Monday, what is the time and day in New Zealand?</p> <p>SOLUTION 6 p.m. to 6 a.m. = 12 h 6 a.m. + (18 – 12 h) = 12:00 Noon Tuesday</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Shape and Space (3-D Objects and 2-D Shapes)

Students will:

- create, analyze and manipulate 3-D objects and 2-D shapes, using transformations, technology and other tools as appropriate, to better understand shapes and objects and their relationships to home, workplace and community environments.

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
General Outcome	
Use spatial problem solving in building, describing and analyzing geometric shapes.	
Specific Outcomes	
<i>Students will:</i>	
<ul style="list-style-type: none"> link angle measures to the properties of parallel lines [CN] 	<p>By examining the size and angles of the following baseboards, identify which baseboards could be meshed together to create a continuous shape.</p> <div data-bbox="569 833 1370 1132"> </div>
<ul style="list-style-type: none"> measure and classify pairs of angles as complementary or supplementary angles [CN, E]. 	<p>SOLUTION</p> <p>A and F, C and E, B and D</p> <div data-bbox="586 1317 1025 1622"> </div>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Create and analyze design problems and architectural patterns, using the properties of scaling, proportion and networks.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> represent, analyze and describe enlargements and reductions [CN, R] interpret scale models, and identify geometric properties associated with, figures and shapes used in representations [CN, R, T] reproduce drawings/objects to scale, using a variety of methods such as grid paper, dot paper and/or computer software [CN, R, T]. 	<p>Kurt has been hired to paint the school logo on a large wall in the school gymnasium. What are the dimensions of the wall logo if it is 120 times larger than a 4.5 cm by 6 cm picture?</p> <p>SOLUTION $4.5 \text{ cm} \times 120 = 540 \text{ cm}$ $6 \text{ cm} \times 120 = 720 \text{ cm}$ 540 cm by 720 cm or 5.40 m by 7.20 m</p> <p><i>Use maps of a mall, historical site, post-secondary campus to locate specific sites.</i></p> <p><i>Reproduce the floor plan of a room in a home.</i></p> <p><i>Describe and solve network problems, such as routes to workplace and bus routes.</i></p>
<p>General Outcome</p> <p>Apply coordinate geometry and pattern recognition to predict the effects of translations, rotations, reflections and dilatations on 1-D lines and 2-D shapes.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> use informal concepts of congruence to describe images after translations, rotations and reflections [CN, V] 	<p><i>Landscaping, laying hardwood or tiles.</i></p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<ul style="list-style-type: none"> test solutions to problems, using technology or other tools such as computer assisted design or simulation/modelling software [CN, PS, V]. 	<p>The Internet can be used to confirm currency conversions, mortgage payments, current temperature, current time zones, maps and distances, ticket costs and seating, and airline costs.</p> <p>Computer software is available to simulate/create models, scale representations.</p>
<p>General Outcome</p> <p>Create and analyze patterns and designs using congruence, symmetry, translation, rotation and reflection.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> draw designs, using ordered pairs, in all four quadrants of a coordinate grid, with translations and reflection images [PS, V] 	<p>Using translation and reflection techniques, create a building floor plan that has four identical apartments on it. Each apartment's door must lead to the hallway in the centre of the building, and each must have the large window facing either North, East, South or West, respectively.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Patterns and Relations (Patterns and Relationships)

Students will:

- recognize that patterns and relationships exist in nature and everyday living
- use patterns and relationships to solve everyday problems at home, in the workplace and in the community.

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Express patterns, including those used in business and industry, in terms of variables, and use expressions containing variables to make predictions.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • create expressions, make predictions and develop rules to describe, complete and extend patterns and relationships in everyday living [CN, PS, R] • distinguish between the use of variables and constants in everyday situations [CN, R] • use variables, formulas and/or substitution to solve problems in practical situations [CN, PS, R]. 	<p><i>Solve problems and make decisions at home and in the workplace based on prior results.</i></p> <p><i>Compare a variety of retail packages, e.g., cell phone, Internet, cable. Discuss the package you would choose and explain why.</i></p> <p><i>Predict a series of events during a year, at home or the workplace, based on previous experiences and outcomes.</i></p> <p><i>Recognize that some relationships/quantities are constants, e.g., the relationship between the circumference of a circle and diameter is pi (π), water freezes at 0°, and formula for calculating area of a quadrilateral.</i></p> <p><i>Recognize and relate paycheque reductions, e.g., paycheque total = hours worked \times hourly pay – deductions.</i></p> <p><i>Calculate area and perimeter using formulas.</i></p> <p><i>A farmer uses this formula for calculating the number of gallons of spray pesticide needed per acre:</i></p> $\text{Number of gallons per acre} = \frac{\text{gallons/minute} \times 6000}{\text{Nozzle spacing (inches)} \times \text{miles per hour}}$ <p>a. A sprayer travels at 6 miles per hour with nozzles spaced 12 inches apart spraying 1.5 gallons per minute. How many gallons of pesticide are used per acre?</p> <p>b. If the cost of pesticide is \$9.50 per gallon, what is the cost for 12 acres?</p> <p>SOLUTION</p> <p>a. $= \frac{(1.5 \text{ gallons/minute}) \times 6000}{(12 \text{ inches}) \times 6 \text{ mph}} = \frac{9000}{72}$</p> <p>$= 125 \text{ gallons per acre}$</p> <p>b. $125 \text{ gallons per acre} \times 12 \text{ acres} \times \\$9.50/\text{gallon} = \\$14\,250$</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Statistics and Probability (Collecting and Analyzing Information)

Students will:

- collect and/or generate data for, and display data and other information for home for, workplace and community applications, using a variety of strategies
- interpret, analyze and maintain data, charts, graphs and other records for personal use
- use probability, chance and predictions when planning and making everyday decisions.

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Use everyday and/or workplace-specific methods, tools and technology to collect, organize, display and/or analyze information.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • recognize the uses of data in life-/work-related situations [CN, R] • record information and organize files and directories, using computers and/or other tools [PS, R, T] • use information and data from a variety of sources to make comparisons, predictions, inferences, conclusions and/or decisions in everyday situations. [PS, R] 	<p><i>Demonstrate an understanding of different types of pay structures, e.g., hourly, weekly, bi-weekly, monthly, annual, commissions, contract work, salary, overtime.</i></p> <p><i>Research and explain which city/area you would make more money shovelling snow, e.g., in northern or southern Alberta. Discuss reasons for using information from Environment Canada or other sources.</i></p> <p><i>Use appropriate strategies/tools to develop, record and implement a personal budget.</i></p> <p><i>Calculate real/simulated gross earnings, e.g., daily, weekly, bi-weekly, monthly, annually.</i></p> <p><i>Record information on time sheets, in logbooks at the workplace.</i></p> <p><i>Use information from a variety of sources to make decisions, e.g., bus schedules, media, work timelines, inventory sheets.</i></p> <p><i>Complete inventories at the workplace.</i></p> <p><i>Read safety manuals to learn more about workplace safety.</i></p> <p><i>Read and interpret instructions to install a DVD player, assemble a picnic table.</i></p> <p><i>Distinguish between gross and net earnings.</i></p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)					
<ul style="list-style-type: none">modify an existing spreadsheet as appropriate for everyday situations [CN, T]	<i>Identify deductions from earnings, e.g., retirement pension plans, union fees, medical insurance, disability insurance, federal/provincial income tax, Canada pension plan, employment insurance.</i>					
	<i>Determine the monthly payment on a loan, using a table and/or other tools.</i>					
	<i>Estimate, verify totals, in credit and debit columns of bank statements or utility bills and on sales slip receipts, invoices.</i>					
	<i>Describe the characteristics of different types of credit, e.g., single payment loans, time payment loans, credit cards, mortgages.</i>					
	<i>Examine and analyze the purpose of savings plans and/or other methods of saving earnings.</i>					
	A sports store has an advertising budget of \$500.00. Outline the best way to use this advertising budget.					
	<i>Calculate earnings based on regular time, time-and-a-half, double time commission, contract work, gratuities.</i>					
	<i>Add information to a record at the workplace, e.g., invoice, inventory sheet, client information.</i>					
	Leo works at a bike shop. He makes \$1000 per month plus commission based on how many bikes he sells. This month he sold 26 bikes for \$150.00 each. His income has been calculated in this spreadsheet.					
	<div>Summary of Leo's Monthly Income<table><tr><th>Guaranteed Income</th><th>6% Commission for 21 or more bikes</th><th>Total Monthly Wage</th></tr><tr><td>\$1000</td><td>\$234</td><td>\$1234</td></tr></table></div>	Guaranteed Income	6% Commission for 21 or more bikes	Total Monthly Wage	\$1000	\$234
Guaranteed Income	6% Commission for 21 or more bikes	Total Monthly Wage				
\$1000	\$234	\$1234				

a. An error was made on this spreadsheet. Leo was supposed to make a 10% commission for 21 or more bikes. Make the appropriate changes to the spreadsheet to fix this error.

SOLUTION

Amount to use for calculating commissions:
26 bikes × \$150.00 = \$3900.00

Summary of Leo's Monthly Income

Guaranteed Income	10% Commission for 21 or more bikes	Total Monthly Wage
\$1000	\$390	\$1390

GRADE 11 (26)

STRAND: Number (Number Concepts and Operations)

Students will:

- estimate and solve problems using numbers, decimals, percents, fractions, ratios and proportion in everyday home, workplace and community situations and technology as appropriate
- develop and demonstrate number sense to describe quantities, represent numbers in multiple ways, and apply appropriate arithmetic operations.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																
<p>General Outcome</p> <p>Solve everyday problems by applying arithmetic operations to whole numbers, decimals, percents, common fractions and integers.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none">• add, subtract, multiply and divide whole numbers in life/work-related problem-solving contexts [CN, PS]	<p>Locate information about employment opportunities and income from a variety of sources. E.g., local businesses, the Alberta Apprenticeship and Industry Training Web site at www.tradesecrets.org, Alberta Learning Information Service Web site at www.alis.gov.ab.ca.</p> <p>List and compare employment income information. E.g., Compare weekly income, pay periods, hourly wages, etc., of a variety of employment opportunities.</p> <p>Calculate the weekly gross pay of a variety of trades and other employment opportunities. E.g.,</p> <p>Comparison of Weekly Gross Pay for Different Trades</p> <table><tr><th>Trade</th><th>Hours Per Week</th><th>Regular Hourly Rate</th><th>Weekly Gross Pay</th></tr><tr><td>Welder</td><td>40</td><td>\$13.00</td><td>\$520.00</td></tr><tr><td>Machinist</td><td>40</td><td>\$ 7.00</td><td>\$280.00</td></tr><tr><td>Cook</td><td>40</td><td>\$ 5.50</td><td>\$220.00</td></tr></table>	Trade	Hours Per Week	Regular Hourly Rate	Weekly Gross Pay	Welder	40	\$13.00	\$520.00	Machinist	40	\$ 7.00	\$280.00	Cook	40	\$ 5.50	\$220.00
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[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																														
<ul style="list-style-type: none">round and estimate as required to solve problems in work-related situations [E, PS, R]	<p>Craig and his 50-member work crew successfully finished a big project! To celebrate, Craig’s manager gave him \$30.00 to buy napkins, forks and a cake. Complete the table (GST is included), and estimate and calculate whether or not Craig will have enough money to treat everyone on the crew.</p> <table><tr><th>Item</th><th>Quantity Per Package</th><th>Number of Packages or Items</th><th>Cost Per Package</th><th>Estimated Costs</th><th>Actual Costs</th></tr><tr><td>Napkins</td><td>20</td><td></td><td>\$ 1.95</td><td></td><td></td></tr><tr><td>Cake</td><td>1</td><td></td><td>\$18.25</td><td></td><td></td></tr><tr><td>Forks</td><td>10</td><td></td><td>\$ 0.99</td><td></td><td></td></tr><tr><td colspan="4">TOTALS</td><td></td><td></td></tr></table> <p>SOLUTION Napkins: 3 packages × \$2.00 = \$6.00 Cake: 1 cake × \$18.00 = \$18.00 Forks: 5 packs × \$1.00 = \$5.00 Estimated Total = \$29.00 Actual Total = \$5.85 + \$18.25 + \$4.95 = \$29.05</p>	Item	Quantity Per Package	Number of Packages or Items	Cost Per Package	Estimated Costs	Actual Costs	Napkins	20		\$ 1.95			Cake	1		\$18.25			Forks	10		\$ 0.99			TOTALS					
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Napkins	20		\$ 1.95																												
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Forks	10		\$ 0.99																												
TOTALS																															
<ul style="list-style-type: none">identify and use appropriate tools, such as tables, charts, spreadsheets and calculators, to increase accuracy in everyday and/or work-related problem-solving situations, [CN, PS, R, T]	<p>Marty works at a bottle depot and uses the tally sheet below to record the returns. Find the total quantity of items and determine the total refund.</p> <table><caption>Bottle Depot Tally Sheet</caption><tr><th>Item</th><th>Tally = 1 item = 5 items</th><th>Total Quantity of Item</th><th>Refund per item (\$)</th><th>Refund (\$)</th></tr><tr><td>Pop and juice cans</td><td> </td><td>24</td><td>0.05</td><td>1.20</td></tr><tr><td>500 mL glass juice bottles</td><td> </td><td>21</td><td>0.10</td><td>2.10</td></tr><tr><td>Over 1 litre containers</td><td> </td><td>18</td><td>0.20</td><td>3.60</td></tr><tr><td colspan="4">TOTAL</td><td>6.90</td></tr></table>	Item	Tally = 1 item = 5 items	Total Quantity of Item	Refund per item (\$)	Refund (\$)	Pop and juice cans	 	24	0.05	1.20	500 mL glass juice bottles	 	21	0.10	2.10	Over 1 litre containers	 	18	0.20	3.60	TOTAL				6.90					
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General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																																																																											
<ul style="list-style-type: none">apply appropriate estimation and calculating skills to solve decimal and money problems in life/work situations [CN, E, PS, T]	<p>Jasmine is closing the convenience store. She uses a cash-out sheet to record the number of coins and bills in the deposit. Estimate, then calculate how much money she will deposit.</p> <div><p>AAA Convenience Store Cash-out Sheet</p><table><tr><td colspan="5">Name: Jasmine Schultz</td></tr><tr><td colspan="5">Date: 09/10/2003</td></tr><tr><td colspan="4">Coins and Bills</td><td>Amount</td></tr><tr><td>\$0.01</td><td>×</td><td>15</td><td>=</td><td>\$ 0.15</td></tr><tr><td>\$0.05</td><td>×</td><td>6</td><td>=</td><td>\$ 0.30</td></tr><tr><td>\$0.25</td><td>×</td><td>7</td><td>=</td><td>\$ 1.75</td></tr><tr><td>\$0.50</td><td>×</td><td>2</td><td>=</td><td>\$ 1.00</td></tr><tr><td>\$1.00</td><td>×</td><td>13</td><td>=</td><td>\$ 13.00</td></tr><tr><td>\$2.00</td><td>×</td><td>9</td><td>=</td><td>\$ 18.00</td></tr><tr><td>\$5.00</td><td>×</td><td>6</td><td>=</td><td>\$ 30.00</td></tr><tr><td>\$10.00</td><td>×</td><td>5</td><td>=</td><td>\$ 50.00</td></tr><tr><td>\$20.00</td><td>×</td><td>7</td><td>=</td><td>\$140.00</td></tr><tr><td>\$50.00</td><td>×</td><td>0</td><td>=</td><td>\$ 0.00</td></tr><tr><td>\$100.00</td><td>×</td><td>1</td><td>=</td><td>\$100.00</td></tr><tr><td colspan="4">TOTAL</td><td>\$354.20</td></tr></table></div>	Name: Jasmine Schultz					Date: 09/10/2003					Coins and Bills				Amount	\$0.01	×	15	=	\$ 0.15	\$0.05	×	6	=	\$ 0.30	\$0.25	×	7	=	\$ 1.75	\$0.50	×	2	=	\$ 1.00	\$1.00	×	13	=	\$ 13.00	\$2.00	×	9	=	\$ 18.00	\$5.00	×	6	=	\$ 30.00	\$10.00	×	5	=	\$ 50.00	\$20.00	×	7	=	\$140.00	\$50.00	×	0	=	\$ 0.00	\$100.00	×	1	=	\$100.00	TOTAL				\$354.20
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<ul style="list-style-type: none">apply appropriate estimation and computation skills to solve everyday problems using percent [CN, E, PS, T]	<p>An apprentice makes a different percentage of a journeyperson’s rate for each year. A journeyperson at Heavy Equipment Inc. makes \$26.50/h. Using the percentages from the following chart, calculate the rate per hour for an apprentice in each year. (Round to nearest cent.)</p> <table><tr><th>Apprentice Year</th><th>Percentage of Journey Rate</th><th>Apprentice’s Rate per Hour</th></tr><tr><td>1</td><td>55%</td><td>\$14.58</td></tr><tr><td>2</td><td>65%</td><td>\$17.23</td></tr><tr><td>3</td><td>75%</td><td>\$19.88</td></tr><tr><td>4</td><td>85%</td><td>\$22.53</td></tr></table> <p>An artist sold a sculpture for \$125. If he spent 30% of the selling price on materials and 15% of the selling price to rent space at an art fair, how much profit did the artist make?</p> <p>SOLUTION Expenses = 30 + 15 = 45% Profit in percent = 100% – 45% = 55% Profit: 55% of \$125 = 0.55 × \$125 = \$68.75</p>	Apprentice Year	Percentage of Journey Rate	Apprentice’s Rate per Hour	1	55%	\$14.58	2	65%	\$17.23	3	75%	\$19.88	4	85%	\$22.53																																																												
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General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																												
<p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none">• apply addition, subtraction, multiplication and division skills as appropriate to solve fraction and mixed number problems in life/work situations [CN, P, R]• use a variety of methods and tools to convert fractional percents to decimal forms [CN, PS, R]• add and subtract integers to solve life/work problems [CN, PS, T].	<p><i>Measure spaces and calculate perimeter and area.</i></p> <p>Lui works an 8-hour shift for a carpenter. She is asked to apply 2 coats of paint to a table. If it takes Lui $\frac{3}{4}$ h to paint the table and $2\frac{1}{2}$ h for each coat of paint to dry, will Lui be able to complete this table for shipment in one day?</p> <p>SOLUTION paint + dry + paint + dry = x hours $\frac{3}{4} + 2\frac{1}{2} + \frac{3}{4} + 2\frac{1}{2} = \frac{26}{4} = 6\frac{1}{2}$ hours</p> <p>It will take Lui $6\frac{1}{2}$ hours to prepare the table. Lui will have enough time during her 8-hour shift to paint the table and to ship it dry.</p> <p><i>Calculate interest rates, provincial and other taxes, e.g., $12\frac{1}{2}\% = 0.125$.</i></p> <p>Martin received an inheritance of \$2400 and deposited it into a savings account. Use the simple interest formula to calculate the amount of interest gained after $2\frac{1}{2}$ years at $3\frac{1}{4}\%$.</p> <p>SOLUTION <i>(Interest = Principal \times Rate \times Time or $I = P \times R \times T$)</i> Simple interest = $\\$2400 \times 0.0325 \times 2.5 = \\195</p> <p><i>Calculate temperature change throughout the day.</i></p> <p>The inventory sheet below is used to record the amount of product received and sold during a day.</p> <table><tr><th colspan="4">Warehouse Inventory Records (kg)</th></tr><tr><th>Time</th><th>Received</th><th>Sold</th><th>Available Inventory</th></tr><tr><td>8:00 a.m.</td><td></td><td></td><td>+25</td></tr><tr><td>8:15 a.m.</td><td>+24</td><td></td><td>+49</td></tr><tr><td>8:25 a.m.</td><td></td><td>-40</td><td>+9</td></tr><tr><td>9:02 a.m.</td><td></td><td>-7</td><td>+2</td></tr><tr><td>9:45 a.m.</td><td>+40</td><td></td><td>+42</td></tr></table> <p>a. Complete the Available Inventory column. b. At 10:00 a.m. a customer came to purchase 25 kg of product. Will the warehouse have enough inventory in stock? b. How much Available inventory is there after 10:00 a.m.?</p> <p>SOLUTION b. Yes, 42 kg are available. c. $42 - 25 = +17$ kg inventory left after 10:00 a.m.</p>	Warehouse Inventory Records (kg)				Time	Received	Sold	Available Inventory	8:00 a.m.			+25	8:15 a.m.	+24		+49	8:25 a.m.		-40	+9	9:02 a.m.		-7	+2	9:45 a.m.	+40		+42
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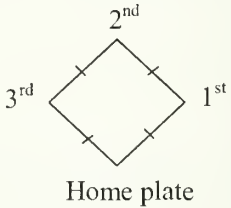
General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Solve everyday problems by applying the concepts of rate, ratio and proportion.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> estimate unit costs and compare costs of purchases [CN, PS, R]. 	<p><i>Apply comparative shopping skills to make purchasing decisions.</i></p> <p>Supplies Etc. sells a package of printer paper for \$12.99. Computers Plus sells 3 packages of printer paper for \$29.89.</p> <ol style="list-style-type: none"> Which store offers the best price for printer paper? What is the difference in price per package between stores? Discuss reasons why people may choose the more expensive package of paper. <p>ESTIMATION Supplies Etc.: \$13.00/pkg. Computers Plus: \$10.00/pkg.</p> <p>SOLUTION</p> <ol style="list-style-type: none"> Supplies Etc. = \$12.99/pkg Computers Plus = $\\$29.89 \div 3 = \\$9.96/\text{pkg.}$ Computer Plus at \$9.96/pkg. Difference $\\$12.99 - \\$9.96 = \\$3.03$ Responses will vary. E.g., People may purchase the more expensive single packages of paper because they do not need 3 packages of paper.

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

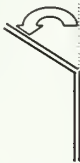
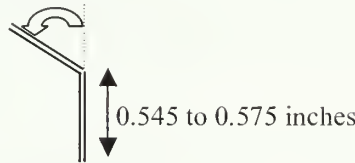
STRAND: Shape and Space (Measurement)

Students will:

- estimate and take accurate measurements in everyday metric (SI) and Imperial units of measurement and solve problems at home, in the workplace and community using appropriate measuring devices, strategies and technology
- working individually or as members of a team, communicate mathematically and investigate the application of measurement knowledge and skills in a variety of careers and workplace situations.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Solve everyday problems by estimating, measuring and comparing, using decimal numbers and fractions, and Imperial and metric units and tools.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none">• use appropriate strategies, tools and units to measure length, volume/capacity, mass, time, temperature and angles within acceptable degrees of accuracy as required in life-/work-related situations [CN, PS, R, T]	<p><i>Measure and/or calculate:</i></p> <ul style="list-style-type: none">• area to purchase hardwood flooring• perimeter to purchase trim around doors• temperature to determine whether or not one has a fever• mass when purchasing bulk foods. <p><i>Use, effectively, a variety of construction tools, e.g., straightedge ruler, compass, protractor, thermometer, computer, micrometer.</i></p> <p><i>Read and interpret the calibrations on meters, scales and gauges frequently used in life-/work-related situations, e.g., electrical meter, compression gauges, blood pressure gauges.</i></p> <p>A volunteer baseball game official measures the distances between bases and home plate to ensure they are equal distances from each other. If the total distance around the bases is 240 feet, how far must each base be from the other?</p> <p>SOLUTION Perimeter = 240 feet $240 \text{ feet} \div 4 \text{ sides} = 60 \text{ feet}$</p>  <p>The diagram shows a diamond-shaped baseball field. The bases are labeled: '2nd' at the top, '1st' on the right, '3rd' on the left, and 'Home plate' at the bottom. Each of the four sides of the diamond has a single tick mark in the middle, indicating that all four sides are of equal length.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
	<p>A sheet metal worker is using a computer-controlled machine to bend a piece of metal. He must make adjustments until the machine reads the correct location and angle of the bend.</p> <ol style="list-style-type: none"> The bend must be 0.560 inches from the end of the rod with an acceptable range of ± 0.015 inches. Calculate the range. The bend is 60° with a range of $\pm 1.5^\circ$. Calculate the range. Use a protractor and ruler to confirm the correct location and angle of the bend.  <p>SOLUTION</p> <ol style="list-style-type: none"> $0.560 - 0.015 = 0.545$ inches $0.560 + 0.015 = 0.575$ inches The acceptable range of measurement is from 0.545 to 0.575 inches. $60^\circ - 1.5^\circ = 58.5^\circ$ $60^\circ + 1.5^\circ = 61.5^\circ$ The acceptable range is from 58.5° to 61.5°. 58.5° to 61.5° 

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

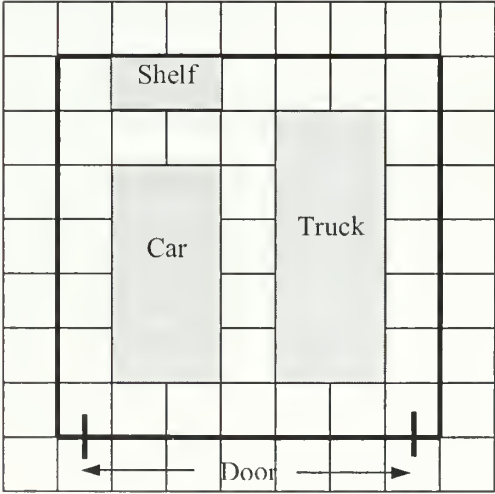
General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																																																
<ul style="list-style-type: none">calculate elapsed time [CN, R]	<p>Calculate and record time worked on timesheets, travel logs.</p> <p>Calculate the number of hours Cynthia worked each day and the total number this week.</p> <table><tr><th colspan="4">Rocket Donuts</th></tr><tr><th colspan="4">Record of Hours Worked</th></tr><tr><th colspan="4">Employee Name: Cynthia Brown</th></tr><tr><th>Date</th><th>Time In</th><th>Time Out</th><th>Hours</th></tr><tr><td>9/13</td><td>3:30 p.m.</td><td>7:00 p.m.</td><td>3.5</td></tr><tr><td>9/14</td><td>5:00 p.m.</td><td>9:30 p.m.</td><td>4.5</td></tr><tr><td>9/15</td><td></td><td></td><td></td></tr><tr><td>9/16</td><td>4:00 p.m.</td><td>10:00 p.m.</td><td>6</td></tr><tr><td>9/17</td><td></td><td></td><td></td></tr><tr><td>9/18</td><td>8:00 a.m.</td><td>1:00 p.m.</td><td>5</td></tr><tr><td>9/19</td><td>1:00 p.m.</td><td>6:00 p.m.</td><td>5</td></tr><tr><td colspan="3">Total hours</td><td>24</td></tr></table>	Rocket Donuts				Record of Hours Worked				Employee Name: Cynthia Brown				Date	Time In	Time Out	Hours	9/13	3:30 p.m.	7:00 p.m.	3.5	9/14	5:00 p.m.	9:30 p.m.	4.5	9/15				9/16	4:00 p.m.	10:00 p.m.	6	9/17				9/18	8:00 a.m.	1:00 p.m.	5	9/19	1:00 p.m.	6:00 p.m.	5	Total hours			24
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<ul style="list-style-type: none">use conversion charts, calculators and/or other tools to compare and convert common SI and imperial units, as required in everyday living [R, T].	<p>Conversion Chart:</p> <table><tr><th>°F</th><th>°C</th></tr><tr><td>150</td><td>65</td></tr><tr><td>200</td><td>100</td></tr><tr><td>250</td><td>120</td></tr><tr><td>300</td><td>150</td></tr><tr><td>350</td><td>180</td></tr><tr><td>400</td><td>200</td></tr><tr><td>450</td><td>230</td></tr><tr><td>500</td><td>260</td></tr></table> <p>A recipe book has temperatures in degrees Celsius. Ryan is cooking at a restaurant that has ovens with temperatures in degrees Fahrenheit. Use the chart to identify the °F Ryan must use for the following °C from the cookbook.</p> <p>180°C = _____°F</p> <p>200°C = _____°F</p> <p>Estimate what 375°F would be in °C.</p> <p>SOLUTION</p> <p>180°C = 350°F</p> <p>200°C = 400°F</p> <p>375°F would be approximately 190°C.</p>	°F	°C	150	65	200	100	250	120	300	150	350	180	400	200	450	230	500	260																														
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STRAND: Shape and Space (3-D Objects and 2-D Shapes)

Students will:

- create, analyze and manipulate 3-D objects and 2-D shapes using transformations, technology and other tools as appropriate to better understand shapes and objects and their relationships to home, workplace and community environments.

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<p>General Outcome</p> <p>Describe the effects of dimension changes in related 2-D shapes and 3-D objects to solve problems involving area, perimeter, surface area and volume.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none">• use scale diagrams, including enlargements and reductions, to solve construction, renovation and other related problems [CN, PS, R, T]	<p>a. Philip is planning to build a garage with dimensions 7 m by 7 m. Use a grid or other strategy to draw a floor plan. Each unit is 1 m.</p> <p>b. Philip’s car is 2 m wide and 4 m long and his truck is 2 m wide and 5 m long. Draw Philip’s vehicles on the garage floor plan so that there is a 1-metre space between each vehicle and the wall. (See diagram below.)</p> <p>c. If he installs a 6-metre wide garage door, draw the most appropriate location for this door. (See diagram below.)</p> <p>SOLUTION</p> 

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)
<ul style="list-style-type: none"> • read and interpret scale drawings and models in workplace and community situations [C, R, T] • interpret scale models, and identify geometric properties associated with the figures and shapes used in these representations [CN, T] 	<p><i>Discuss with co-workers blueprints, technical drawings, project plans.</i></p> <p><i>Assemble furniture using drawings and/or directions.</i></p> <p><i>Plan a simple construction or repair project by:</i></p> <ul style="list-style-type: none"> – <i>preparing scale drawings/models</i> – <i>identifying appropriate steps/procedures</i> – <i>estimating, calculating costs of materials</i> <p><i>Locate retail outlets using mall maps.</i></p> <p><i>Use maps of vacation sites to find specific locations, e.g., maps of Banff or Jasper National Parks.</i></p> <p>Use a grid to draw a scale diagram of a workshop with dimensions 7.5 m by 8.0 m. (1 cm = 1 m) Draw a workbench along an 8 m wall that will be 4 m by 0.8 m. Find the total cost to paint the floor of the workshop at a cost of \$2.20/m².</p> <p>SOLUTION $\\$2.20/\text{m}^2 \times 60 \text{ m}^2 = \\132.00</p>
<ul style="list-style-type: none"> • describe, analyze and solve network problems [CN, R] 	<p><i>Interpret and use bus routes, telephone exchange/area codes, postal codes.</i></p> <p><i>Use a public transportation system and map to locate and arrive at job interview sites at designated times.</i></p> <p><i>Use provincial maps to plan vacations in Alberta, British Columbia and other locations.</i></p>
<ul style="list-style-type: none"> • give verbal and written directions, applying appropriate communication skills [C, PS, R]. 	<p><i>Give instructions to get to a specific location, make a doghouse, change a patient's bedding, install a door, change a tire.</i></p> <p>Draw a floor plan of your workplace. Label specific areas.</p> <p>Draw and label exit plans and the meeting place for your workplace.</p> <p>Plan an emergency exit strategy for the workplace and share with your supervisor.</p>

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization

STRAND: Patterns and Relations (Patterns and Relationships)

Students will:

- recognize that patterns and relationships exist in nature and everyday living
- use patterns and relationships to solve everyday problems at home, in the workplace and in the community.

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Use patterns, variables and expressions, together with their graphs, to solve problems.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none"> • use relationships and patterns to summarize, generalize and predict when problem solving and decision making in life-/work-related contexts [CN, PS, R] • generalize patterns arising from everyday problem-solving contexts, using arithmetic expressions and equations, and/or verify by substitution [CN, PS, R] 	<p>Sarah is planning to start a lawn maintenance company. Create a list of the equipment Sarah will need. Locate information using media and other sources and determine approximately how much this equipment would cost.</p> <p>If clients paid Sarah an average of \$60 per job, how many jobs would it take to pay off the equipment?</p> <p>Contact local companies to determine what they charge for lawn maintenance. Discuss whether or not Sarah could compete with them.</p> <p>Each roll of 24 prints, r, costs \$6.95, each second set of prints, s, costs \$4.50, and individual prints, i, costs \$1.10 each. If a customer develops 4 rolls of film, gets a second set of prints for 3 of these rolls, and makes 9 individual prints, what is the total cost, C?</p> $C = 4r + 3s + 9i$ <p>SOLUTION</p> $C = (4 \times \$6.95) + (3 \times \$4.50) + (9 \times \$1.10) = \51.20 <p>Car payments are \$230 per month and it costs \$0.68/kilometre to travel. If C represents the total cost, p is the monthly payment and d represents the total distance travelled in kilometres, use the equation $C = p + d$ to calculate the monthly cost of a vehicle during a month of driving 150 km.</p> <p>SOLUTION</p> $C = 230 + (0.68 \times 150)$ $C = \$332.00$

[C] Communication, [CN] Connections, [E] Estimation and Mental Mathematics, [PS] Problem Solving, [R] Reasoning, [T] Technology, [V] Visualization


STRAND: Statistics and Probability (Collecting and Analyzing Information)

Students will:

- collect and/or generate data, and display data and other information for home, workplace and community applications, using a variety of strategies
- interpret, analyze and maintain data, charts, graphs and other records for personal use
- use probability, chance, and predictions when planning and making everyday decisions.

General and Specific Outcomes	<i>Examples of Everyday Applications and Illustrative Examples (Discretionary)</i>
<p>General Outcome</p> <p>Use appropriate tools, methods and strategies to collect, display and analyze information and data at home, in the workplace and in the community.</p> <p>Specific Outcomes</p> <p><i>Students will:</i></p> <ul style="list-style-type: none">• read, interpret and extract information from graphs, tables, charts and other sources at home and in the workplace [CN, R]	<p><i>Demonstrate an understanding of federal and provincial tax forms.</i></p> <p><i>Identify/confirm deductions from personal income.</i></p> <p><i>Extract and interpret information from everyday workplace spreadsheets and databases, such as time sheets, log books, schedules, utility bills and other records.</i></p> <p><i>Interpret information from personal financial statements, such as bank statements, personal credit card statements and other itemized bills and invoices.</i></p> <p><i>Extract and interpret information from schedules, such as transportation schedules and routes, media schedules.</i></p> <p><i>Describe the characteristics of various plans for saving and investing money, e.g., savings accounts, bonds, guaranteed investment certificates, mutual funds, registered retirement savings plans.</i></p> <p><i>Use appropriate tools/strategies to calculate simple and/or compound interest on loans and investments over periods of time.</i></p>

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General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																																																																
<ul style="list-style-type: none">record and organize information and data as appropriate in life-/work-related situations [CN, R]	<p>Use the following payroll record to respond to the questions.</p> <ol style="list-style-type: none">How many hours did Sandra Shanowski work this week? (22 h)What position does she have? (Apprentice Auto Service Technician)What was her gross pay this week? (\$192.50)How much did she pay in taxes this week? (\$42.35)How much were her total deductions? (\$56.60)What was Sandra's net (take home) pay? (\$135.90)																																																																
	<table><tr><td colspan="4">Springfield Auto Body</td></tr><tr><td colspan="4">1254 Albert Road, Red Deer</td></tr><tr><td colspan="4">Payroll Record</td></tr><tr><td colspan="4">Employee Name: Sandra Shanowski</td></tr><tr><td colspan="4">Position: Apprentice Auto Service Technician</td></tr><tr><td colspan="2">Rate: \$8.75/h</td><td colspan="2">Social Security No.: 123 454 678</td></tr><tr><td>Date</td><td>Time In</td><td>Time Out</td><td>Hours</td></tr><tr><td>3/13</td><td>8:00</td><td>3:30</td><td>7.5</td></tr><tr><td>3/14</td><td>11:00</td><td>2:00</td><td>3.0</td></tr><tr><td>3/15</td><td>11:00</td><td>4:00</td><td>5.0</td></tr><tr><td>3/16</td><td>1:00</td><td>4:30</td><td>3.5</td></tr><tr><td>3/17</td><td>2:00</td><td>5:00</td><td>3.0</td></tr><tr><td colspan="3">Total hours</td><td>22</td></tr><tr><td colspan="3">Total Weekly Gross Pay @8.75/h</td><td>\$192.50</td></tr><tr><td colspan="2">Tax Deduction \$42.35</td><td>Life Insurance \$3.00</td><td>Total Deductions \$56.60</td></tr><tr><td colspan="2">Union Fee \$2.50</td><td>Health Insurance \$8.75</td><td>NET PAY \$135.90</td></tr></table>	Springfield Auto Body				1254 Albert Road, Red Deer				Payroll Record				Employee Name: Sandra Shanowski				Position: Apprentice Auto Service Technician				Rate: \$8.75/h		Social Security No.: 123 454 678		Date	Time In	Time Out	Hours	3/13	8:00	3:30	7.5	3/14	11:00	2:00	3.0	3/15	11:00	4:00	5.0	3/16	1:00	4:30	3.5	3/17	2:00	5:00	3.0	Total hours			22	Total Weekly Gross Pay @8.75/h			\$192.50	Tax Deduction \$42.35		Life Insurance \$3.00	Total Deductions \$56.60	Union Fee \$2.50		Health Insurance \$8.75	NET PAY \$135.90
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	<p>Complete a real/simulated personal income tax return.</p> <p>Implement and maintain a personal budget.</p>																																																																
	<p>Create an after school work schedule for John, Paul, Lisa and Susan. There must be two employees per shift. Some of these employees left a note on the staff board below explaining when they can or cannot work.</p>																																																																
	<div><div>Notes To Our Manager</div><div><div></div><div>I cannot work Tuesday or Thursday. Thanks, Lisa!</div><div>I have exams next week and can only work Thursday. Thank you, John.</div><div>Monday and Friday are my baseball game nights. Please do not schedule me to work. Thanks, Paul.</div></div></div>																																																																

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General and Specific Outcomes	Examples of Everyday Applications and Illustrative Examples (Discretionary)																														
<ul style="list-style-type: none">use probability and statistics to predict upcoming events and to make decisions in everyday life [CN, R].	<table><tr><th>Hours</th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th></tr><tr><td>4:00–5:00</td><td>Lisa Susan</td><td>Paul Susan</td><td>Lisa Paul</td><td>John Paul</td><td>Lisa Susan</td></tr><tr><td>5:00–6:00</td><td>Lisa Susan</td><td>Paul Susan</td><td>Lisa Paul</td><td>John Paul</td><td>Lisa Susan</td></tr><tr><td>6:00–7:00</td><td>Lisa Susan</td><td>Paul Susan</td><td>Lisa Paul</td><td>John Paul</td><td>Lisa Susan</td></tr><tr><td>7:00–8:00</td><td>Lisa Susan</td><td>Paul Susan</td><td>Lisa Paul</td><td>John Paul</td><td>Lisa Susan</td></tr></table>	Hours	Monday	Tuesday	Wednesday	Thursday	Friday	4:00–5:00	Lisa Susan	Paul Susan	Lisa Paul	John Paul	Lisa Susan	5:00–6:00	Lisa Susan	Paul Susan	Lisa Paul	John Paul	Lisa Susan	6:00–7:00	Lisa Susan	Paul Susan	Lisa Paul	John Paul	Lisa Susan	7:00–8:00	Lisa Susan	Paul Susan	Lisa Paul	John Paul	Lisa Susan
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	See IOP Studio (online guide to implementation).																														
	<i>Use information and data to make decisions about working extra hours, making purchases, etc.</i>																														
	<i>Use the mode or mean to make recommendations about menu changes at the restaurant you work at or visit.</i>																														
	The highest rate of injuries in the workplace occurs in the 15–24 year-old age group. A media article stated that two youth workers are injured every week in Canada. According to this article, approximately how many youth workers will be injured in one year?																														
SOLUTION 2 × 52 weeks = 104 youth workers will be injured in one year.																															
If you had the opportunity to take a work safety course, would you? Discuss why or why not with classmates.																															
A media article states that there are many jobs in trades. Would this information influence your career decisions? Discuss why or why not.																															
Investigate employment-related Web sites. Use the information to make decisions about and/or set goals for your future.																															

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